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Agricultural Marketing Service

Pesticide Data Program

United States Department of Agriculture

Agricultural Marketing Service

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March 9, 1992

To the Reader:

The Agricultural Marketing Service of the United States Department of Agriculture in May 1991, implemented the Pesticide Data Program to collect objective, comprehensive data on pesticide residues for fresh fruit and vegetables. This program was submitted to Congress as part of the President's 1991 budget to address the increased interest in food safety by producers and consumers.

This program was designed to provide government agencies with an improved data base to respond more effectively to food safety issues. The primary recipient of the program's data will be the Environmental Protection Agency, which will use this information to support its risk assessment process.

The enclosed report provides residue data for the last 8 months of calendar year 1991. This program has been funded by Congress and is operated through cooperative agreements with six participating States. These States, California, Florida, Michigan, New York, Texas, and Washington, have the responsibility for sample collection and residue analyses.

The program was expanded in 1992 to include additional commodities and pesticide classes. This information will be reflected in future reports.

We welcome comments regarding this report. Comments should be addressed to:

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PESTICIDE DATA PROGRAM

Calendar Year 1991 Report

Agricultural Marketing Service

U.S. Department of Agriculture

AGENCY FOOD SAFETY ACTIVITIES

The Agricultural Marketing Service (AMS) administers more than 50 statutes which are designed to facilitate and promote fair trading practices for agricultural commodities based on measures of quality, safety and wholesomeness. AMS enforces the Egg Products Inspection Act which provides for continuous inspection at egg breaking and processing plants producing liquid, frozen, or dried egg products. AMS also provides analytical testing for microbiological and chemical constituents in processed dairy products, eggs, meat and poultry, and fruit and vegetables in support of voluntary grading, certification, laboratory accreditation and acceptance programs. AMS works cooperatively with other Federal public health agencies in conducting mycotoxin contamination studies in peanut products and testing for chemical residues in domestic and imported produce. Furthermore, AMS has a strong working relationship with the States, particularly regarding fruit and vegetables. The Science Division conducts laboratory programs in support of AMS food safety and quality activities.

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EXECUTIVE SUMMARY

The Agricultural Marketing Service (AMS) of the United States Department of Agriculture (USDA) began the residue testing program in May 1991 as part of USDA's Pesticide Data Program (PDP). This program collects actual concentration levels of pesticide residues in fresh fruit and vegetables close to the consumer level while retaining product origin. The PDP program is a result of President Bush's 1989 Food Safety Proposal, and has been funded by Congress for 2 years. AMS developed PDP's policy and operations procedures and residue testing priorities in close cooperation with the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). These data are to be used by EPA for pesticide risk assessment and serve as an initial data base for national residue testing so that government agencies can respond more effectively to food safety issues.

The residue monitoring program is being implemented in stages based on the data needs expressed by EPA. The data presented in this report reflect the first stages of that plan. The sample collections and analyses were conducted by six participating States: California, Florida, Michigan, New York, Texas, and Washington. These States represent diverse geographic regions, approximately 40 percent of the Nation's population, and a large segment of the fresh fruits and vegetables grown in the U.S.

Testing began in mid-May 1991 with three commodities -- grapes, lettuce, and potatoes. By September 1991, apples, bananas, grapefruit, and oranges were added. Analysis began with 8 chlorinated pesticides of interest to EPA and expanded to include organophosphate pesticide analysis for a total of 11 pesticides of interest to EPA by November 1991. This includes 24 of the 88 pesticide/commodity pairs of EPA interest -- excluding methyl bromide. By the end of the calendar year, 34 different pesticide residues were detected.

A total of 1,963 samples, apportioned by State population, were collected in the 6 States. These samples were collected at random from terminal produce markets and chain store distribution centers. States provided quarterly sampling plans based on AMS's quarterly program plan for commodities and pesticides to be tested. Every State identified a random date each month for collecting all samples for a commodity from different sites. This procedure enabled the laboratories to provide the necessary quality control criteria to ensure the integrity and reliability of the data. Sample origin was from the 6 participating States, 27 additional States, and 13 countries.

At the laboratory, samples were examined for acceptability for analysis. Only the edible portions of the products were prepared, employing procedures similar to those consumers would use, and analyzed. Each laboratory used its current analytical procedures, but was required to meet PDP quality control (QC) standards necessary to demonstrate equivalency of data for the 11 pesticides of interest to EPA, and for reporting other detected pesticides.

The QC requirements included a list of pesticide detection levels, laboratory capability studies, and rigorous QC controls with each set of samples tested. In addition, all laboratories participated in a proficiency testing program to demonstrate performance and determine laboratory capability on unknown samples.

A total of 1,901 samples were analyzed. There were 422 samples (22 percent) with detectable levels of pesticide residues, i.e., "positive samples." The percentage of positive samples varied by commodity as follows: apples (38 percent), grapes (34 percent), potatoes (27 percent), oranges (19 percent), lettuce (17 percent), grapefruit (16 percent), and none in bananas. There were four violations from four different States for pesticide residues having no commodity tolerances. Ten of the 11 pesticides of interest to EPA were detected (the exception being hexachlorobenzene) and covered 9 pesticide/commodity pairs. Two pesticide/commodity pairs, dicloran and iprodione in grapes, were detected in samples collected in all six States.

There were 511 pesticide residues detected in the 1,901 samples analyzed. These pesticide residues represented 34 different chlorinated and/or organophosphate pesticides of which 199 (39 percent) were of interest to EPA. The number of pesticide/commodity pairs showing the greatest percentage of findings were: iprodione/grapes (15.2 percent), dicloran/grapes (14.6 percent), chlorpyrifos/apples (15.7 percent), permethrins/lettuce (9.4 percent). Most of the residues were detected at levels substantially below tolerance levels. A tolerance is the amount of pesticide residue permitted on agricultural products in the USA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Other pesticide/commodity pairs showing large detection percentages were: chlorpropham/potatoes (17.9 percent), azinphos methyl/apples (15.6 percent), captan/apples (8.6 percent), and thiabendazole in citrus (60 percent)--applicable only to Michigan samples. Imazalil, a post harvest fungicide, was detected in 10.2 percent of the citrus products tested.

The significance of the residue findings will be determined by EPA's risk assessment process. See Appendix C for uses and toxicology for each pesticide.

SECTION 1.

PROGRAM INTRODUCTION

1.0 PROGRAM INTRODUCTION

USDA's Pesticide Data Program (PDP) is a result of President Bush's 1989 Food Safety Proposal which called for streamlining government's ability to assess potentially hazardous pesticides in food. Government agencies charged with pesticide oversight responsibilities consider reliable pesticide residue data to be of paramount importance in achieving the President's objective. The mission of the PDP is to collect objective, comprehensive data on actual pesticide residues in food at the consumer level. In 1991, the Agricultural Marketing Service began residue monitoring efforts to determine actual concentration levels in fresh fruit and vegetables.

PDP's operations for the past year were multi-departmental. USDA developed the program's policy and operational procedures and initial residue priorities in close cooperation with the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). In addition, the data presentation is compatible with FDA's nomenclature system which enhances the close cooperation on uniform data reporting between government agencies, and also supplements FDA's enforcement responsibility.

The primary recipient of the residue data is EPA, which will use the data to support its pesticide risk assessment process for reregistration or special review. Congressional support to fund this program reflects the increased interest in pesticide issues by producers and consumers. The data presented in this report serve as the initial data base for government agencies to use in responding more effectively to food safety issues involving pesticide residues.

The residue monitoring program is being implemented in stages based on the overall data needs expressed by EPA, so that the integrity of the data is not compromised. The data presented in this report reflect the initial stages of that plan. The testing program operations are designed so that pesticide issue priorities and changes in program emphasis requested by EPA can be readily implemented. However, to provide comprehensive reliable data for risk assessment evaluations, the program is designed to collect actual residue data on at least a 2-year cycle. This cycle will accommodate availability of fresh produce from a variety of growing areas.

Although PDP is USDA sponsored, the sample collections and residue analysis for selected pesticides were done by the six participating States: California, Florida, Michigan, New York, Texas, and Washington. Furthermore, these States had the staff, expertise, and facilities to provide these testing services in a matter of months. Collectively, these States represent approximately 40 percent of the U.S. population and diverse geographic regions of the U.S. These States account for a large segment of the fresh produce grown in the U.S.

The samples were collected at terminal produce markets and chain store distribution centers. These sampling points are the closest level to the consumer that still enables the origin of the samples to be identified. This approach is a major departure from using the farm gate or packing house, normally the preferred site for programs charged with enforcement of tolerances. The objective of collecting these data is to provide an assessment of pesticide

residue in fresh fruit and vegetables: accounting for product time in transit, taking into account population demographics, and determining actual consumer exposure level by EPA for each pesticide studied on edible portions of the product.

From the onset, PDP was designed to generate high quality data. Pesticide residues reported were replicated and verified using alternate detection systems. Focused analysis on specific pesticides of interest to EPA enabled PDP to achieve detection of residues at lower concentration levels than generally reported from other testing programs.

Table 1.1 lists the 7 commodities and 11 pesticides of interest to EPA which were included in the residue testing program in 1991. This approach encompasses 24 of the 88 pesticide/commodity pairs which were designated by EPA, with the exception of methyl bromide which required an analytical procedure unavailable in all participating States. The testing plans were developed and introduced to maximize the pesticides of interest to EPA, using the resources available.

Program operations began in mid-May 1991, with three States--Florida, New York, and Washington. In June 1991, Michigan and Texas started sample testing, and in July 1991 California began its testing program. The three initial commodities chosen--grapes, lettuce, and potatoes--coupled with the 8 chlorinated pesticides on the EPA list covered 11 of the pesticide/commodity pairs. These initial eight pesticides were: chlorpyrifos, dicloran, hexachlorobenzene, iprodione, lindane, methoxychlor, the permethrins, and quintozene (PCNB). The general criteria for EPA initially selecting these pesticides were based on: (1) toxicity of the pesticide, (2) likelihood of the need for market place residue data for more accurate exposure assessment, and (3) the need for residue data to support minor use registrations. The 11 pesticides on the EPA list were targeted for analysis in all commodity samples. For the other pesticides added to the testing system, emphasis was placed on analyzing for pesticide residues in specific commodities where frequent detections were noted.

In August 1991, grapefruit and oranges were included; and, in September 1991, apples and bananas were added, making a total of seven commodities. Testing capability was expanded in October 1991 to include dicofol, and again in November to include acephate and methamidophos, as part of the organophosphate class of pesticides. Additional capability was added incrementally whenever new pesticides were detected and their sensitivity and quality control requirements were determined. At the end of 1991, 34 different pesticides were detected in the testing system, including some post harvest fungicides, such as imazalil.

This report is presented in several sections. The Sampling section describes the sampling background and procedure, profiles sampling sites by city, and gives the origin of the samples tested. The Laboratory Overview section provides a description of the sample preparation methods, testing procedures, and quality control requirements to produce data of high quality. The Sample Results section profiles pesticide residues found by commodity, and residues detected by pesticide and State, highlighting the pesticide/commodity pairs of interest to EPA. There are three appendices: (A) State monthly sampling plans, (B) Distribution of residues by pesticide, and (C) Profile of the uses and toxicology of the pesticide residues detected.

TABLE 1.1
EPA PESTICIDE/COMMODITY PAIRS MONITORED FOR RESIDUES

PESTICIDE	COMMODITY*						
	Apples	Bananas	Grapefruit	Grapes	Lettuce	Oranges	Potatoes
Acephate					✓		
Chlorpyrifos	✓	✓	✓	✓		✓	
Dicloran (Botran®)				✓	✓		✓
Dicofol (o,ρ' and ρ,ρ')	✓		✓			✓	
HCB		✓					
Iprodione				✓	✓		
Lindane					✓		
Methamidophos					✓		✓
Methoxychlor	✓			✓			
Quintozene (PCNB)		✓					
Permethrin (cis and trans)	✓				✓		✓

* Potatoes, grapes, and lettuce monitoring began in May 1991. Grapefruit and oranges were added in August 1991, and apples and bananas were added in September 1991.
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SECTION 2.

SAMPLING

2.0 SAMPLING

2.1 Introduction

The distribution system for fresh fruits and vegetables is very complex and additional time is required to develop a statistically-defensible protocol for sampling these products, e.g., Florida has primarily a chain store distribution system, whereas California relies heavily on terminal produce markets. To meet the immediate needs of the Pesticide Data Program (PDP), a set of initial sampling procedures was developed. These procedures were based on produce distribution information that was available at the beginning of PDP implementation, and will be revised as additional information is obtained.

These initial sampling procedures allocate samples across major sources of variability in the distribution chain for fresh produce, e.g., major distribution centers, origin of product (domestic or imported), geographical areas in the U.S., and seasons of the year.

The purpose of these initial sampling procedures is to obtain objective, comprehensive data on the concentrations of pesticide residues in designated domestic and imported fresh fruits and vegetables that were available for sampling during calendar year 1991 in major distribution channels in the States of California, Florida, Michigan, New York, Texas, and Washington. The reason for using random selection processes in these initial procedures is to obtain samples in an objective manner that is as free as possible of judgmental decisions by the persons responsible for collecting the samples. Valid statistical inferences from the data obtained using these initial sampling procedures will not be possible at the National or State level.

The PDP results from 1991 provide an objective representation of the pesticide residue concentrations in chain store distribution centers and terminal markets in the six participating States. The results obtained from PDP are uniquely based on the collection of random samples, and as such, should not be combined or summarized with any existing Federal or State data. The primary sources of existing government data in most instances are samples obtained in a manner to increase the chance of finding violative samples.

The PDP initial, as well as final, sampling programs will be treated as processes that need ongoing review in order to identify problems and take appropriate corrective actions. These programs will be continuously improved based on these reviews and feedback from personnel involved with the program.

2.2 Sampling Procedures

Sampling was based on at least a minimum of 500 randomly selected samples per commodity per year. To replace samples received in poor condition where analysis was not advisable or where commodities were not available, a 20 percent sample overage was required. A total of 52 samples were collected each month, for an annual total of 624 samples. Samples

collected included imported products, commodities grown within the State, and commodities grown in other States but in distribution channels in the participating State. Sample selection was based on the general commodity, regardless of variety and origin. However, the variety (e.g., leaf lettuce, Golden Delicious apples, etc.) was stated on the sample form to provide additional information if needed for data assessment. A 2- to 5-pound composite sample, representing several parts of the grower's lot being sampled, was collected. Samples were distributed proportionally among the six participating States as shown below based on each State's population:

California	168	---	14 samples/commodity/month
Florida	96	---	8 samples/commodity/month
Michigan	84	---	7 samples/commodity/month
New York	108	---	9 samples/commodity/month
Texas	108	---	9 samples/commodity/month
Washington	60	---	5 samples/commodity/month
TOTAL	**624**		**52 samples**

The Science Division (SD) of AMS provided a quarterly plan for commodities to be tested. The quarterly plan specified the sampling requirements by commodities for each month in the quarter. Each State was required to submit a sampling plan listing locations of possible sampling sites. These sampling sites were further identified by a three-digit code or reference number which was incorporated in the sample nomenclature. In addition, the States provided a sampling date (or two consecutive dates) selected randomly, assuring that samples would be collected, if possible, at least once from each site within a given sampling year and that each commodity would have a different collection date; although using random selection, the same collection date could be used for more than one commodity. This procedure enabled the program to maintain objectivity in the sample selection process and allowed State laboratories to receive the same commodity in sets, thereby, meeting laboratory quality control requirements established by the program. Appendix A shows in calendar format the proposed monthly sampling plans of all participating States from May through December 1991.

The number of chain store distribution centers and terminal markets identified as sample collection sites varied by State. It was the States' responsibility to identify these sites, to assign them reference numbers, and to assure that sample(s) were collected from at least each site on a random basis within a given sampling year before resampling the same site. Table 2.1 is a list of sample collection sites (cities/areas) by State. Figure 1 shows maps depicting the geographic distribution of the sites by State. The number of sites varies from 9 in Washington to 224 in California. In California, as well as in New York, the number of sites exceeded the number of samples to be collected annually.

Sample collectors were instructed to write a USDA sample number on all copies of the Sample Collection Forms. This number was designed to incorporate the following: (1) the State in which the sample was collected, (2) the sampling date, (3) the sample site code, and (4) the product code. The nomenclature requirements and instructions, provided to each State for dissemination to the sample collectors, generated unique sample numbers

constructed by the collector on-site. States were requested to use alternate sampling sites in the event that a commodity was not available at the original sampling site. These alternate sites were also chosen at random, but could be located in the vicinity of the original sites for logistical purposes and to meet time requirements to complete sample sets. A total of 1,963, 98.8 percent of the proposed 1,986 samples, were collected. Tabulation of the 1,963 samples collected (May through December 1991) by State is as follows: California (503), Florida (304), Michigan (252), New York (363), Texas (339), and Washington (202).

Table 2.2 shows the origin of all samples taken for calendar year 1991 (May through December). As shown in this table, the sample origins cover not only the 6 participating states, but also 27 other States as well as 13 foreign countries. The table also shows that: (1) all bananas were imports, (2) the majority of lettuce and grapes originated in California, (3) the majority of citrus products (oranges and grapefruit) originated in California and Florida, (4) a substantial number of apples originated in Washington, and (5) potatoes originated from a large number of States.

The distribution of samples by origin is greatly affected by bananas. Excluding bananas, the distribution of commodities per origin is as follows: 85 percent originated in the 6 participating States, 12 percent originated in non-participating States, 2 percent were imported, and for the remaining 1 percent the origin was not available. If bananas are included, the distribution of the commodities per origins is 76 percent for the 6 participating States, 11 percent for the additional States, 12 percent imported, and, for the remaining 1 percent, the origin was not available.

TABLE 2.1
SAMPLING SITES BY STATE

CALIFORNIA

City	Percent of Sites	Percent of Samples
Avenal	1	0.4
Bakersfield	3	1.3
Byron	1	0.4
Chico	1	0.4
Colton	1	0.4
East Bay (Oakland)	30	13.4
Fairfield	1	0.4
Fresno	5	2.2
Lake Tahoe	1	0.4
Los Angeles Basin	82	36.6
Madera	1	0.4
Merced	1	0.4
Monterey Bay Area	3	1.3
Mount Shasta	1	0.4
Oxnard Area	2	0.9
Redding	1	0.4
Sacramento Area	23	10.3
San Diego Area	3	1.3
San Luis Obispo Area	2	0.9
San Jose	3	1.3
San Rafael	2	0.9
Stockton Area	7	3.1
Ukiah	1	0.4
Visalia	1	0.4
West Bay (San Francisco)	45	20.1
Yuba City Area	2	0.9
TOTAL	224	

FLORIDA

City	Number of Sites	Percent of Samples
Green Cove Springs	1	4.8
Jacksonville	5	23.8
Lakeland	1	4.8
Miami	1	4.8
Orlando	2	9.5
Plant City	2	9.5
Pompano Beach	4	19.0
Tampa	5	23.8
TOTAL	21	

WASHINGTON

City	Number of Sites	Percent of Samples
Seattle/Tocoma	5	55.6
Spokane	3	33.3
Yakima	1	11.1
TOTAL	9	

MICHIGAN

City	Percent of Sites	Percent of Samples
Ann Arbor Area	5	12.2
Battle Creek	1	2.4
Bay City	1	2.4
Cadillac	1	2.4
Decatur	1	2.4
Detroit Area	12	29.3
Flint	2	4.9
Grand Rapids	6	14.6
Kalamazoo	1	2.4
Lansing Area	7	17.1
Niles	1	2.4
Saginaw	1	2.4
Standish	1	2.4
Traverse City	1	2.4
TOTAL	41	

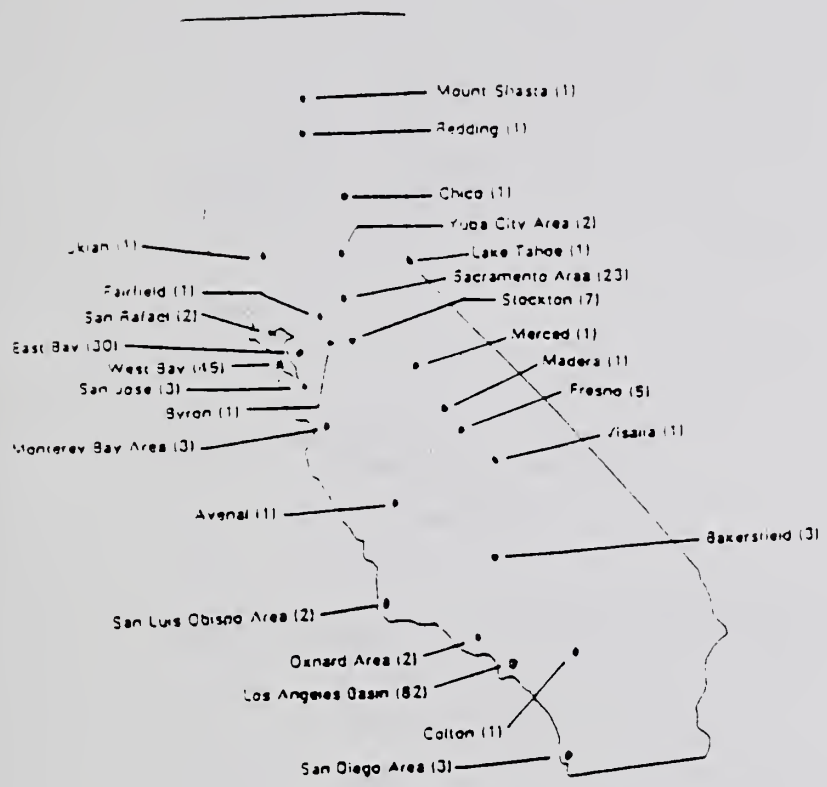
NEW YORK

City	Number of Sites	Percent of Samples
Albany	11	7.6
Albion	1	0.7
Buffalo	14	9.7
Canastota	3	2.1
Castile	1	0.7
Chittenango	2	1.4
Horseheads	1	0.7
Ithaca	1	0.7
Jamestown	3	2.1
Lockport/Batavia Area	4	2.8
Long Island	7	4.8
Marion	2	1.4
New York City	58	40.0
Norwich	1	0.7
Ontario	1	0.7
Oswego	3	2.1
Plattsburg Area	2	1.4
Rochester	6	4.1
Schoharie	1	0.7
Southeast New York	14	9.7
Syracuse	6	4.1
Utica	2	1.4
Willsboro	1	0.7
TOTAL	145	

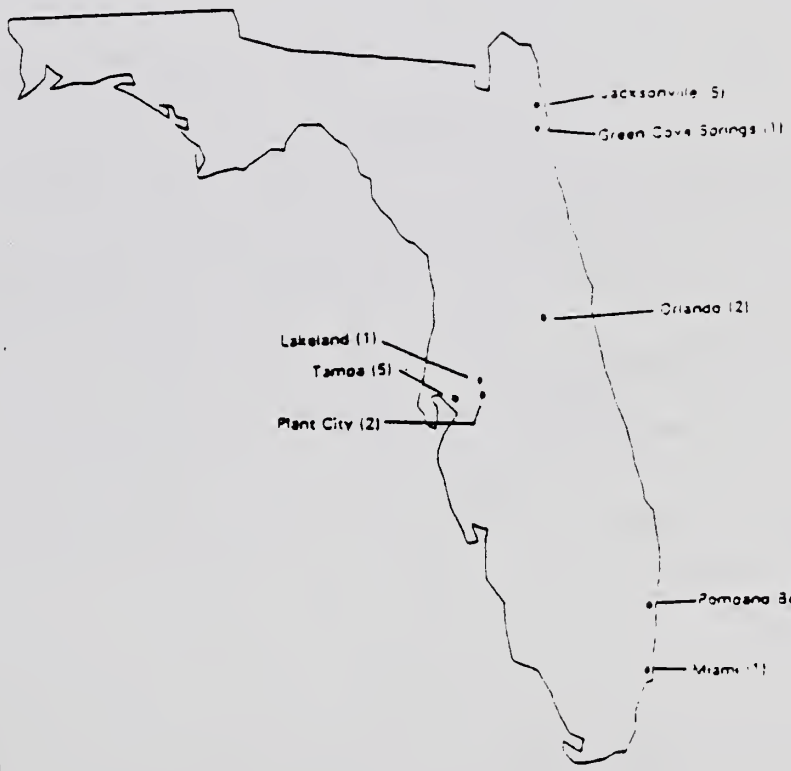
TEXAS

City	Number of Sites	Percent of Samples
Amarillo	1	3.7
Brenham	1	3.7
Dallas/Fort Worth	10	37.0
El Paso	1	3.7
Houston	8	29.6
Lubbock	1	3.7
Lufkin	1	3.7
San Antonio	3	11.1
Tyler	1	3.7
TOTAL	27	

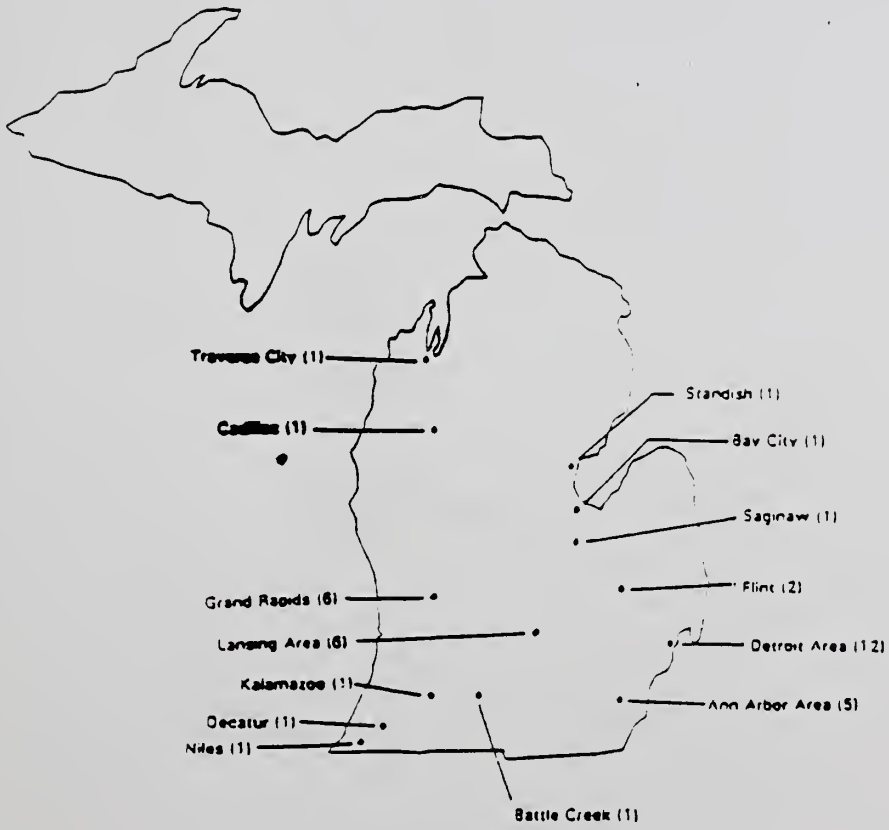
FIGURE I
MAPS OF GEOGRAPHIC DISTRIBUTION OF SITES BY STATE



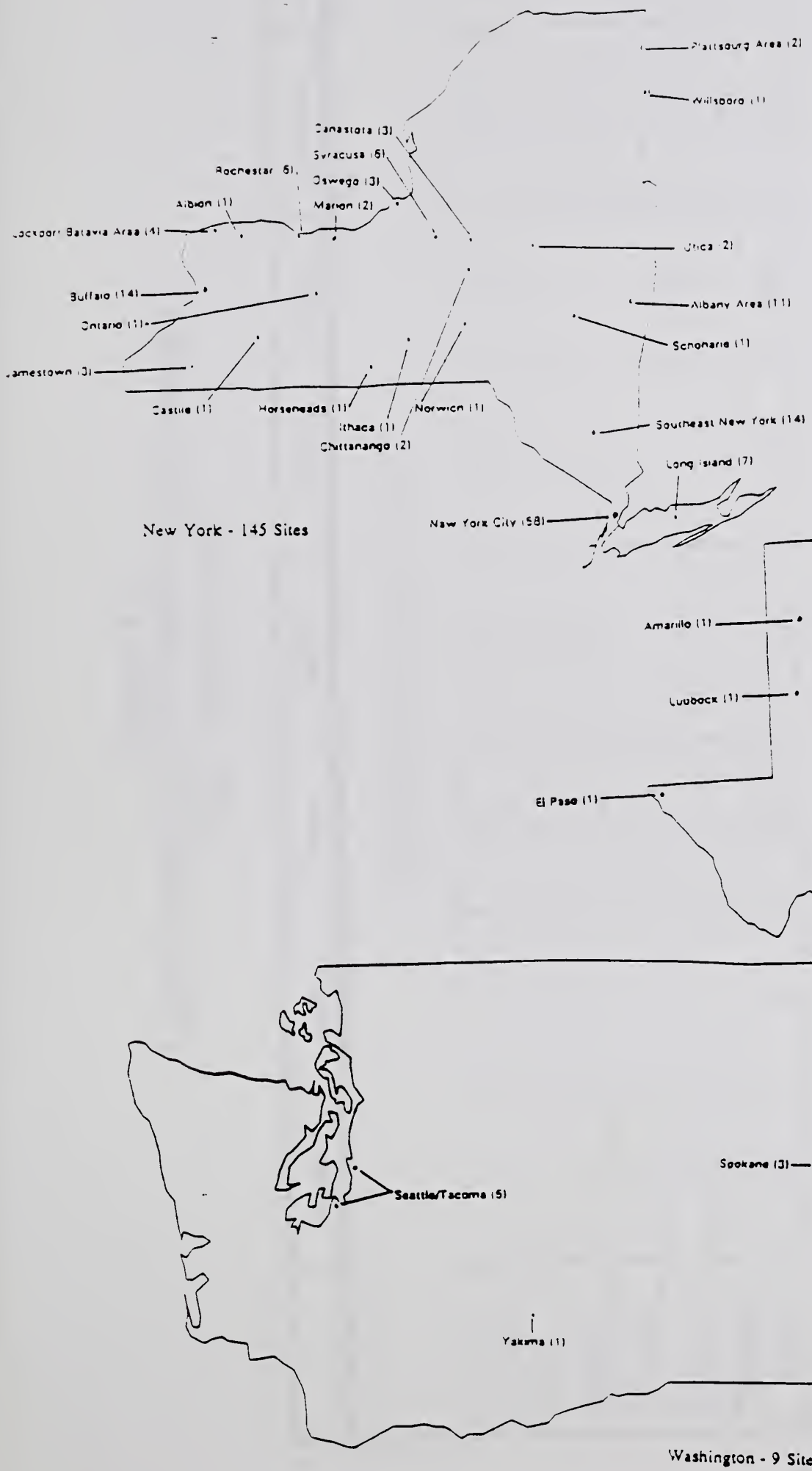
California - 224 Sites



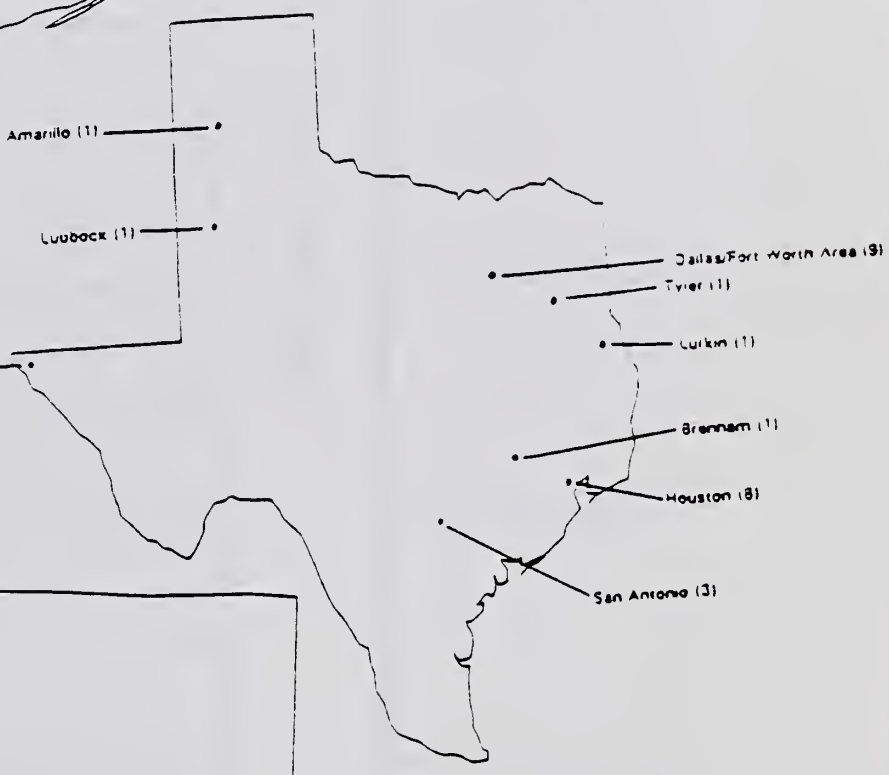
Florida - 21 Sites



Michigan - 41 Sites



New York - 145 Sites



Texas - 27 Sites

Washington - 9 Sites

TABLE 2.2
SAMPLE PROFILE BY ORIGIN (Grower/Packer)
May - December 1991

	Apples	Bananas	Grapes	Grapefruit	Lettuce	Oranges	Potatoes	TOTAL
Participating States (Total = 1,493)								
California	28		287	111	292	158	55	931
Florida			9	131	2	87	9	238
Michigan	15		1	1 (a)	9		19	45
New York	23		1		3		34	61
Texas	3			4	1	4	24	36
Washington	101		1		16		64	182
TOTAL	**170**	**0**	**299**	**247**	**323**	**249**	**205**	**1,493**
Other States (Total = 212)								
Alabama							3	3
Arizona			9	3	19	1	2	34
Colorado							15	15
Delaware							3	3

TABLE 2.2 (continued)

	Apples	Bananas	Grapes	Grapefruit	Lettuce	Oranges	Potatoes	TOTAL
Georgia	2							2
Idaho	10						53	63
Illinois							2	2
Iowa							1	1
Louisiana						1	1	2
Maine							4	4
Massachusetts	2						1	3
Minnesota	2		1				6	9
Missouri	3							3
Nevada	1							1
New Mexico					2		2	4
New Jersey					1			1
North Carolina	5							5
North Dakota							1	1
Ohio					2			2
Oklahoma							1	1
Oregon	4				1		24	29
Pennsylvania	2						1	3

TABLE 2.2 (continued)

	Apples	Bananas	Grapes	Grapefruit	Lettuce	Oranges	Potatoes	TOTAL
Utah	2							2
Vermont	2							2
Virginia	3							3
West Virginia	1							1
Wisconsin							13	13
TOTAL	39	0	10	3	25	2	133	212
Other Countries (Total = 230)								
Bahamas				1				1
Canada	1						2	3
Chile			9					9
Costa Rica		25						25
Colombia		26						26
Dominican Rep.						1		1
Ecuador		75						75
Guatemala		21						21
Honduras		18						18

TABLE 2.2 (continued)

	Apples	Bananas	Grapes	Grapefruit	Lettuce	Oranges	Potatoes	TOTAL
Mexico		19	16			1		36
New Zealand	1							1
Panama		10						10
Venezuela		2	2					4
TOTAL	2	196	29	1	0	2	2	230
Origin Not Available (Total = 28)								
		7	6	6	3	3	3	28

(a) Origin not verified

COMMODITY	SAMPLING PERIOD	TOTAL # OF SAMPLES
Apples	September - December	211
Bananas	September - December	203
Grapes	May - December	342
Grapefruit	August - December	257
Lettuce	May - December	351
Oranges	August - December	256
Potatoes	May - December	343
	TOTAL	1,963

SECTION 3.

LABORATORY OVERVIEW

3.0 LABORATORY OVERVIEW

3.1 Sample Preparation

Upon receipt at the laboratory, the entire product was examined for sample acceptability. Any product received in poor condition, such as extensive bruising, off odor, decay, and fungal growth, was discarded and not analyzed. For quality control (QC) and productivity, it was imperative that samples be analyzed in sets. The requirements to analyze one sample have the same rigorous criteria as for multiple sample sets. Samples were held up to 72 hours under refrigeration, so that all samples per commodity were received for analysis as a single set.

The entire product was homogenized and at least four representative samples (aliquots) were prepared for testing. Aliquots, which may be needed for replicate or verification testing, were retained frozen. When testing could not be performed immediately, the entire commodity set, plus all quality control samples, were frozen for QC requirements. This ensured that acceptability of data could be verified when analyses were performed at a later date.

In preparing samples for analyses, any debris, wilted leaves, and stems were removed. The product was then rinsed for 15 to 20 seconds under cold tap water to parallel normal consumer preparation. Since, for risk assessment studies, the interest is in analyzing only edible products, the laboratory removed and discarded cores of the product, pits, or other inedible material before the sample was homogenized.

3.2 Sample Analysis

In 1991, each laboratory used its own extraction procedure and detection system, utilizing instrumentation available at the facility. All laboratories were required to meet rigorous quality control criteria, so that data equivalency could be established for the 11 pesticides of interest to EPA and to correlate differences in detection capability for the other pesticides detected in the testing program.

Accepted methodology included the Luke extraction procedures in effect in Florida, Michigan, New York, and Texas. California used its own extraction procedure and Washington used both the California and Luke methods. Elemental selective detectors were used for initial detection of the chlorinated and organophosphate pesticides in the testing system. Verification was accomplished separately, using a retained sample based on several acceptable analytical techniques. Where available, confirmation was achieved using mass spectrometry. Alternate specific detectors or separation systems, providing definitive information on the pesticides in question, were also accepted in the 1991 program.

Participating laboratories provided information on their limits of detection for each of the pesticides which could be detected in their respective systems. These limits are summarized in Table 3.1 by pesticide and State.

3.3 Quality Control Requirements

Each laboratory was required to meet the basic data quality objectives of the program before its data was complete. These requirements are:

- o Documented capability of the laboratory staff performing the tests.

- o Records of method performance with each set of samples collected as follows: (1) pesticide spiked commodities for daily method performance to ascertain pesticide recoveries and laboratory precision; (2) reagent and commodity blanks to determine interferences and aid in determining potential pesticides; and, (3) pesticide reference standards to establish calibration criteria in calculating pesticide concentrations.

- o A pesticide process standard added to each sample to measure recovery and to ensure that individual tests meet the established quality control standards.

3.4 Quality Assurance

All State laboratories participated in a Proficiency Check Sample Program to demonstrate performance and determine laboratory capability on unknown samples. In 1991, two sets of samples consisting of three commodities each, fortified with pesticides in the testing program, were forwarded to each laboratory. The analyzed results on these samples provided valuable information to the laboratories to enhance their internal quality control procedures.

TABLE 3.1
LIMITS OF DETECTION OF RESIDUES BY STATE

PESTICIDES	CA	FL	MI	NY	TX	WA
	PARTS PER BILLION (a)					
ACEPHATE*	25	10	22	5	10	80
AZINPHOS METHYL	6	NA	NA	3	NA	NA
CAPTAN	10	10	70	3	10	20
CHLORPROPHAM	100	10	60	10	10	960
CHLORPYRIFOS*	10	4	25	2	8	5
CHLORPYRIFOS ME.	10	4	5	4	8	4
DCPA	15	10	8	2	15	20
pp'-DDD	10	3	NA	NA	NA	3
pp'-DDE	9	3	6	2	8	5
pp'-DDT	10	8	NA	2	NA	3
DIAZINON	35	NA	NA	3	7	NA
DICLORAN*	10	4	8	3	15	3
DICOFOL*	80	4	15	3	15	10
DIMETHOATE	55	10	NA	1	NA	NA
ENDOSULFAN I/II	15/7	10/10	7/6	1/2	2/2	6/6
ENDOSULFAN SULFATE	30	10	10	4	2	6
ETHION	NA	2	NA	1	NA	NA
HCB*	10	4	2	1	8	0.6
IMAZALIL	100	NA	15	6	20	400
IPRODIONE*	100	20	50	10	20	30
LINDANE*	10	4	6	2	8	3
MALATHION	NA	10	NA	6	NA	10
METHAMIDOPHOS*	25	10	10	3	10	8
METHIDATHION	NA	4	NA	20	NA	NA

TABLE 3.1 (continued)

PESTICIDES	CA	FL	MI	NY	TX	WA
	PARTS PER BILLION (a)					
METHYL PARATHION	40	10	NA	NA	NA	10
METHOXYCHLOR*	50	10	50	3	20	6
MYCLOBUTANIL	20	NA	40	10	20	NA
PCP-METHYLSULFIDE	NA	10	NA	NA	NA	NA
PENTACHLOROANILINE	NA	50	NA	NA	NA	NA
PENTACHLOROBENZENE	NA	30	NA	NA	NA	NA
PERMETHRINS*	20	25	100	10	20	30
PHOSMET	100	NA	NA	3	NA	NA
QUINTOZENE* (PCNB)	10	4	5	2	8	1
THIABENDAZOLE	NA	NA	40	NA	NA	NA
VINCLOZOLIN	20	10	40	3	10	6

* EPA recommended pesticides.
CA: California
FL: Florida
MI: Michigan
NY: New York
TX: Texas
WA: Washington
(a) These values are based on the current instrumentation available in the laboratories
NA Not available

SECTION 4.

SAMPLE RESULTS

4.0 SAMPLE RESULTS

In 1991, a total of 1,901 samples were analyzed out of 1,963 samples collected. Nine data sets consisting of 62 samples from Michigan for November and December 1991, have not been included in the report due to delays in analyzing samples.

All samples were analyzed according to the pesticide testing plans for each month. From May through December 1991, these pesticides were: chlorpyrifos, dicloran, hexachlorobenzene (HCB), iprodione, lindane, methoxychlor, permethrins, and quintozene (PCNB). In October 1991, dicofol was added as part of the testing profile for all 6 States, and in November 1991, acephate and methamidophos were added for a total of 11 pesticides. In addition, 24 other pesticides were detected, however, capability for detection and detection limits varied by State, as shown in Table 3.1. Ten of these pesticides were added as part of the testing profile in October 1991, for all State laboratories based on the following selected commodities:

Grapes:	Captan, endosulfan I, II and sulfate, myclobutanil, and vinclozolin
Grapefruit:	Imazalil
Oranges:	Imazalil
Lettuce:	DCPA
Potatoes:	Chlorpropham (CIPC), and p,p' DDE

Thirteen additional pesticides listed in Table 4.1 were detected in at least one of the seven commodities tested after October 1, 1991, and listed by State in Table 4.2. Michigan had the capability of detecting thiabendazole using a multiresidue screen by employing mass spectrometry detection. In Table 4.2, the only pesticide/commodity pairs from EPA list detected in all six States were dicloran and iprodione in grapes. Chlorpropham in potatoes was reported in all States except Florida.

There were a total of 422 samples, 22 percent, having pesticide residues. This ranges from 74 out of 197 samples, 38 percent, with 15 different residues for apples, to bananas, where no residues were detected. The descending order of the percentage of samples in which residues were detected in the other 5 commodities are: grapes (34 percent), potatoes (27 percent), oranges (19 percent), lettuce (17 percent), and grapefruit (16 percent). Ten of the 11 pesticides of initial interest to EPA were detected in at least one commodity, except for HCB. Of the 24 pesticide/commodity pairs in Table 1.1, nine pairs had at least one sample which contained a detectable level of pesticide residue, i.e., a positive sample.

There were four violations, listed in Table 4.1. They were iprodione and acephate in apples, chlorpyrifos in lettuce, and pentachlorobenzene in potatoes. In all cases, there were no established tolerances for that particular commodity and pesticide shown in Table 4.2, and each of them was from a different State.

Appendix B is a compilation of total pesticide residues detected. In all there were 511 residue findings representing 34 different pesticides in the 1,901 samples analyzed. For the 11 pesticides on the EPA list, there were 199 residue findings. Appendix B lists all of the

pesticides detected by total number of samples, number of positive findings, percent of positive samples, and mean value of the residue detected. For the 11 pesticides on the initial test list, all results were listed, even if residues were not detected. For the other pesticides reported, only those commodities where residues were detected are listed.

The pesticide/commodity pairs from the EPA list showing the largest number/percentage of pesticide detections were: iprodione/grapes (50/15.2 percent), dicloran/grapes (48/14.6 percent), chlorpyrifos/apples (31/15.7 percent), and permethrins/lettuce (33/9.4 percent). The mean residue concentration detected were respectively; 0.28 ppm, 0.24 ppm, 28 ppb, 0.58 ppm. These 4 pairs accounted for 130 or 64 percent of the 199 residue findings for the 11 pesticides of initial EPA interest.

For the other pesticides reported by commodity, the most prevalent pesticides detected in apples were azinphos methyl in 15.7 percent of the samples with a mean concentration of 0.10 ppm, applicable to apples collected after October 31, 1991, and captan in 8.6 percent of the samples with a mean concentration of 86 ppb. In potatoes, chlorpropham (CIPC) was detected in 17.9 percent of the samples tested from May 1991, with a mean concentration of 1.11 ppm. Michigan detected thiabendazole in approximately 60 percent of the citrus fruit tested.

Appendix C is a use and toxicology profile of the pesticides. These pesticides were either in the testing plans or detected in commodities tested in 1991. They covered a wide spectrum of use compounds from insecticides, fungicides, post-harvest fungicides, herbicides, acaricides, manufacturing impurities, and metabolites of compounds included in the testing profile.

TABLE 4.1
DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

PESTICIDES DETECTED	NUMBER OF SAMPLES ANALYZED	NUMBER OF POSITIVE SAMPLES	PERCENT OF POSITIVE SAMPLES
APPLES			
Acephate (v) Azinphosmethyl Captan **Chlorpyrifos*** Diazinon **Dicofol*** Dimethoate Ethion Endosulfan I & II Endosulfan Sulfate Iprodione (v) **Methoxychlor*** Methyl Parathion Phosmet	197	74	38
Total = 15			
BANANAS			
None	197	0	0
Total = 0			
GRAPEFRUIT			
Chlorpyrifos* Ethion Imazalil Thiabendazole	250	39	16
Total = 4			

TABLE 4.1 (continued)

PESTICIDES DETECTED	NUMBER OF SAMPLES ANALYZED	NUMBER OF POSITIVE SAMPLES	PERCENT OF POSITIVE SAMPLES
GRAPES			
Captan **Dicloran*** Dimethoate Dicofol Endosulfan I & II Endosulfan Sulfate **Iprodione*** Lindane Myclobutanil Quintozene Vinclozolin	328	113	34
Total = 12			
LETTUCE			
Acephate* Chlorpyrifos (v) DCPA Diazinon **Dicloran*** DDE Endosulfan I & II Endosulfan Sulfate **Methamidophos*** **Permethrins***	351	59	17
Total = 11			
ORANGES			
Chlorpyrifos* Dicofol Ethion Imazalil Malathion Methidathion Thiabendazole	242	46	19
Total = 7			

TABLE 4.1 (continued)

PESTICIDES DETECTED	NUMBER OF SAMPLES ANALYZED	NUMBER OF POSITIVE SAMPLES	PERCENT OF POSITIVE SAMPLES
POTATOES			
Captan Chlorpropham DDD DDE DDT Diazinon **Dicloran*** Ethion Endosulfan I & II Endosulfan Sulfate Quintozene PCP Methylsulfide Pentachloroaniline Pentachlorobenzene(v)	336	91	27
Total = 15			

PESTICIDES DETECTED TOTAL	SAMPLES ANALYZED TOTAL (a)	POSITIVE SAMPLES TOTAL (b)	PERCENT OF POSITIVE SAMPLES
34	**1,901**	**422**	**22**

* Pesticide/commodity pairs of interest to EPA.

(a) Does not include the State of Michigan samples for the following:
November -- apples, grapefruit, grapes, and oranges.
December -- apples, bananas, grapes, oranges, and potatoes.

(b) More than one residue may have been detected in some of the positive samples.

(v) Violation: residues found where no tolerance was established.

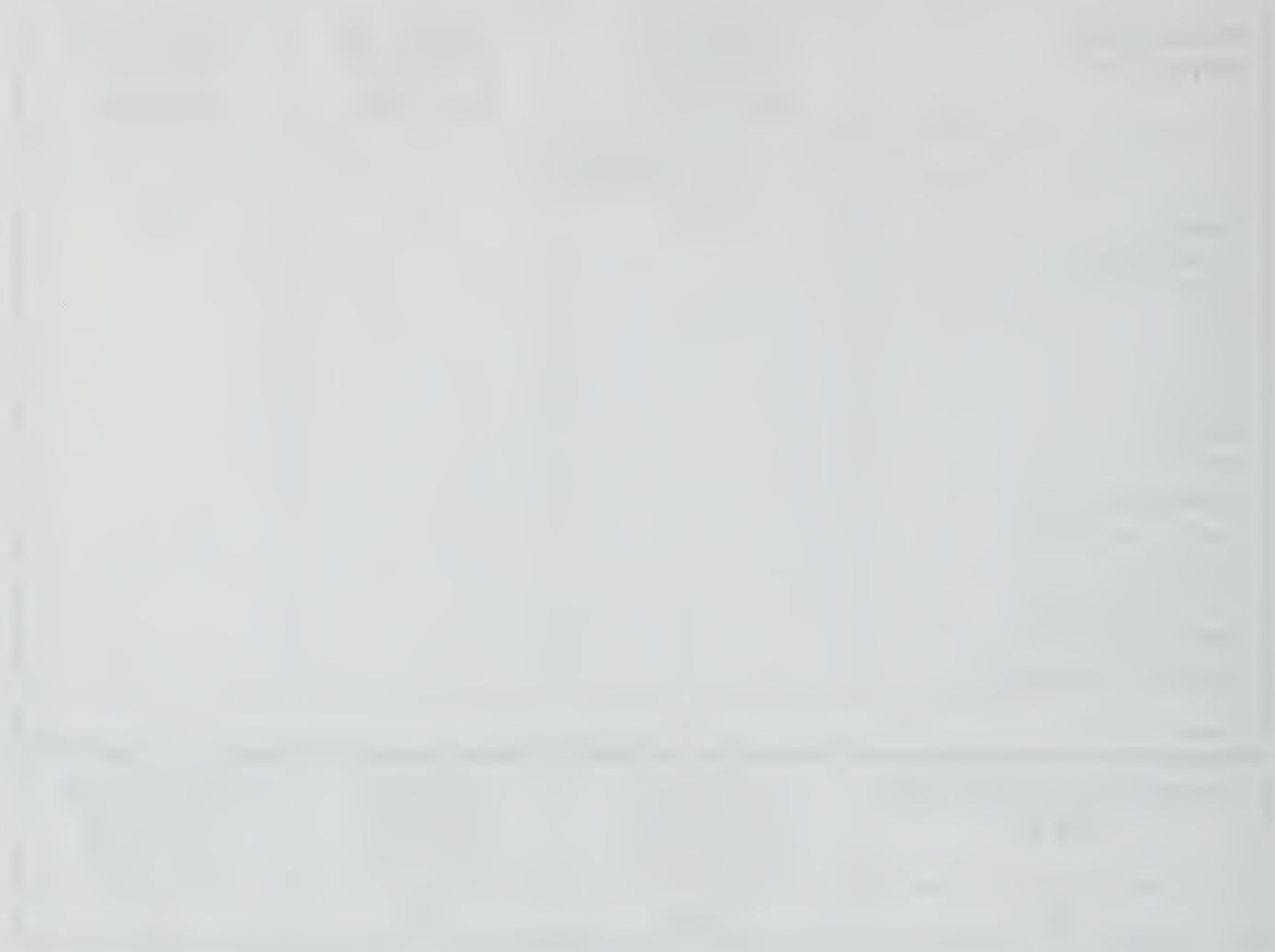


TABLE 4.2
RESIDUE CONCENTRATION LEVELS AND STATE DISTRIBUTION

PESTICIDE	COMMODITY	STATES	MIN.	MAX.	TOLER-ANCE (ppm)**
Acephate*	Apples(v)	TX	17 B	17 B	None
	Lettuce*	CA, NY	8 B	34 B	10
Azinphos-Methyl	Apples	CA, NY	3 B	0.31 M	2.0
Captan	Apples	FL, NY, TX	10 B	0.17 M	25
	Grapes	NY, TX	16 B	0.57 M	50
	Potatoes	MI	0.17 M	0.23 M	25[1]
Chlorpropham	Potatoes	CA,MI,NY, TX,WA	10 B	10 M	50
Chlorpyrifos*	**Apples***	CA, FL, NY, TX	3 B	85 B	1.5
	Grapefruit*	TX	19 B	30 B	1.0
	Lettuce (v)	CA	50 B	50 B	None[2]
	Oranges*	TX	0.12 M	0.36 M	1.0
DCPA	Lettuce	CA, WA	8 B	30 B	2
pp'-DDE	Potatoes	CA, FL, NY, TX	3 B	27 B	1[3]
	Lettuce	CA, NY	9 B	30 B	0.5[3]
pp'-DDD	Potatoes	FL	3 B	3 B	1[3]
pp'-DDT	Potatoes	FL, NY	8 B	29 B	1[3]
Diazinon	Apples	CA	35 B	35 B	0.5
	Lettuce	CA	57 B	57 B	0.7
	Potatoes	TX	7 B	8 B	0.1
Dicloran*	**Potatoes***	NY, WA	10 B	0.11 M	0.25
	Grapes*	CA,FL,MI, NY,TX,WA	2B	1.1 M	10
	Lettuce*	CA	6 B	0.12 M	10

TABLE 4.2 (continued)

PESTICIDE	COMMODITY	STATES	MIN.	MAX.	TOLER-ANCE (ppm)**
Dicofol*	**Apples**	CA, NY	59 B	0.60 M	5
	Grapes	CA, FL, NY, TX	4 B	0.46 M	5
	Oranges*	FL	20 B	75 B	10
Dimethoate	Apples	CA, NY	20 B	0.35 M	2
	Grapes	FL	0.25 M	0.25 M	1
Endosulfans	Apples	CA, TX	13 B	56 B	2.0
	Grapes	CA, NY, TX	4 B	0.13 M	2.0
	Lettuce	CA, NY, TX, WA	11 B	0.21 M	2.0
	Potatoes	NY, TX	8 B	16 B	0.2[4]
Endosulfan Sulfate	Apples	CA, NY, TX, WA	10 B	19 B	2.0
	Grapes	CA, NY, TX	10 B	44 B	2.0
	Lettuce	NY, TX, WA	9 B	80 B	2.0
	Potatoes	NY, TX	5 B	98 B	0.2[4]
Ethion	Apples	CA	0.36 M	0.36 M	2.0
	Grapefruit	FL	2 B	2 B	2.0
	Oranges	FL, NY	2 B	24 B	2.0
Imazalil	Grapefruit	MI, NY, TX	11 B	0.30 M	10
	Oranges	NY, TX	6 B	0.44 M	10
Iprodione*	Apples (v)	WA	0.18 M	0.18 M	None
	Grapes*	CA,FL,MI, NY,TX,WA	10 B	1.1 M	60.0
Lindane*	Grapes	NY	34 B	34 B	1
Malathion	Oranges	NY	6 B	0.17 M	8
Methidathion	Oranges	FL, NY	4 B	19 B	2.0

TABLE 4.2 (continued)

PESTICIDE	COMMODITY	STATES	MIN.	MAX.	TOLER-ANCE (ppm)**
Methamidophos*	**Lettuce***	TX	43 B	43 B	1.0
Methyl Parathion	Apples	CA	43 B	0.15 M	1
Methoxychlor*	**Apples***	FL, WA	60 B	0.24 M	14
Myclobutanil	Grapes	CA, MI, NY, TX	19 B	0.17 M	1.0
PCP-Methylsulfide (a)	Potatoes	FL	10 B	10 B	0.1[5]
Pentachloroaniline (a)	Potatoes	FL	50 B	50 B	0.1[5]
Pentachlorobenzene	Potatoes (v)	FL	30 B	30 B	None
Permethrins* (both)	**Lettuce***	CA, NY, TX, WA	0.11 M	3.3 M	20.0
Phosmet	Apples	CA, NY	11 B	0.44 M	10
	Grapes	NY	39 B	39 B	10
Quintozene* (PCNB)	Potatoes	CA, FL, WA	3 B	40 B	0.1[1]
Thiabendazole	Grapefruit	MI	39 B	0.27 M	10
	Oranges	MI	0.12 M	0.43 M	10
Vinclozolin	Grapes	FL, NY	33 B	0.27 M	6.0

* Pesticide/ commodity pairs of interest to EPA.
** Tolerances' significant figures as expressed in the 40 CFR, Part 180.
(v) Violation: residues found where tolerances were not established.
1 Interim tolerance.
2 Tolerance not established although there is a pending tolerance listed at 40 CFR Part 180.342.
3 Tolerances for DDT, DDE, DDD as individual or in combination were revoked on 12/24/86. Numbers cited are administrative guidelines/action levels.
4 Negligible residue tolerance.
5 Administrative guidelines.
M Parts per million.
B Parts per billion.

APPENDICES

APPENDIX A
PROPOSED STATE SAMPLING PLANS

FROM MID-MAY 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
13	14	15	16 NY Grapes, 5	17
20 NY Potatoes, 1	21 NY Potatoes, 3	22 FL Grapes, 4	23 NY Potatoes, 1	24
27	28 FL Lettuce, 4 NY Lettuce, 1 WA Grapes, 2 WA Lettuce, 3 WA Potatoes, 3	29 FL Potatoes, 4 NY Lettuce, 3	30 NY Lettuce, 1	31

Commodity	Proposed Sampling Dates
Grapes:	16th, 22nd, 28th
Lettuce:	28th, 29th, 30th
Potatoes:	20th, 21st, 23rd, 28th, 29th

TOTAL NUMBER OF SAMPLES: 35

APPENDIX A (continued)
PROPOSED STATE SAMPLING PLANS -- JUNE 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
3	**4** FL Grapes, 4 TX Potatoes, 4	**5** TX, Potatoes, 1	**6**	**7**
10 NY Grapes, 6 TX Grapes, 7 WA Grapes, 2 WA Lettuce, 2 WA Potatoes, 2	**11** FL Lettuce, 5 NY Grapes, 1 WA Grapes, 3 WA Lettuce, 3 WA Potatoes, 3	**12** TX Lettuce, 6	**13**	**14**
17 NY Potatoes, 6	**18** FL Potatoes, 6 NY Potatoes, 1	**19**	**20**	**21**
24 MI Lettuce, 2 NY Lettuce, 3	**25** MI Lettuce, 2 NY Lettuce, 7	**26** MI Lettuce, 2	**27**	**28**

Commodity	Proposed Sampling Dates
Grapes:	4th, 10th, 11th
Lettuce:	10th, 11th, 12th, 24th, 25th, 26th
Potatoes:	4th, 5th, 10th, 11th, 17th, 18th

TOTAL NUMBER OF SAMPLES: 78

APPENDIX A (continued)
PROPOSED STATE SAMPLING PLANS -- JULY 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1	2	3	4	5
8 WA Grapes, 5	9 NY Grapes, 9 TX Potatoes, 9	10 CA Lettuce, 7	11 CA Lettuce, 7 MI Potatoes, 7	12
15 WA Lettuce, 5	16 CA Potatoes, 7 NY Lettuce, 9 TX Grapes, 9	17 CA Potatoes, 7 FL Lettuce, 8	18	19
22 WA Potatoes, 5	23 FL Grapes, 8 NY Potatoes, 9 TX Lettuce, 9	24 CA Grapes, 7 MI Grapes, 7	25 CA Grapes, 7	26
29 FL Potatoes, 8 MI Lettuce, 7	30	31		

Commodity	Proposed Sampling Dates
Grapes:	8th, 9th, 16th, 23rd, 24th, 25th
Lettuce:	10th, 11th, 15th, 16th, 17th, 23rd, 29th
Potatoes:	9th, 11th, 16th, 17th, 22nd, 23rd, 29th

TOTAL NUMBER OF SAMPLES: 156

APPENDIX A (continued)
PROPOSED STATE SAMPLING PLANS -- AUGUST 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
			1	2
5 NY Oranges, 9 WA Lettuce, 5	6 CA Oranges, 7 FL Grapes, 8 NY Grapes, 9 TX Potatoes, 9	7 CA Oranges, 7	8 MI Grapefruit, 7	9
12 NY Grapefruit, 9 TX Grapes, 9 WA Grapefruit, 5	13 CA Grapes, 7 FL Lettuce, 8 MI Potatoes, 7	14 CA Grapes, 7 NY Potatoes, 9 WA Grapes, 5	15 TX Lettuce, 9	16
19 CA Potatoes, 7 WA Potatoes, 5	20 CA Potatoes, 7 FL Oranges, 8 TX Oranges, 9	21 CA Grapefruit, 7 FL Potatoes, 8 MI Grapes, 7 NY Lettuce, 9	22 CA Grapefruit, 7	23
26 MI Oranges, 7 WA Oranges, 5	27 CA Lettuce, 7 FL Grapefruit, 8	28 CA Lettuce, 7 MI Lettuce, 7 TX Grapefruit, 9	29	30

Commodity	Proposed Sampling Dates
Grapes:	6th, 12th, 13th, 14th, 21st
Grapefruit:	8th, 12th, 21st, 22nd, 27th, 28th
Lettuce:	5th, 13th, 15th, 21st, 27th, 28th
Oranges:	5th, 6th, 7th, 20th, 26th
Potatoes:	6th, 13th, 14th, 19th, 20th, 21st

TOTAL NUMBER OF SAMPLES: 261

APPENDIX A (continued)
PROPOSED STATE SAMPLING PLANS -- SEPTEMBER 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
2	**3** CA Lettuce, 7 MI Bananas, 7 NY Apples, 9 WA Apples, 5	**4** CA Lettuce, 7 MI Grapefruit, 7 NY Grapes, 9 TX Potatoes, 9	**5** FL Apples, 8 WA Lettuce, 5	**6**
9 CA Grapes, 7 TX Grapes, 9	**10** CA Grapes, 7 FL Oranges, 8	**11** CA Bananas, 7 FL Potatoes, 8 MI Lettuce, 7 NY Grapefruit, 9 NY Oranges, 9 TX Lettuce, 9 WA Grapefruit, 5	**12** CA Bananas, 7	**13**
16 CA Grapefruit, 7 MI Oranges, 7 TX Oranges, 9 WA Oranges, 5	**17** CA Grapefruit, 7 FL Bananas, 8 NY Bananas, 9	**18** CA Apples, 7 FL Lettuce, 8 MI Apples, 7 TX Grapefruit, 9 WA Potatoes, 5	**19** CA Apples, 7 MI Grapes, 7 NY Lettuce, 9	**20**
23 CA Potatoes, 7 NY Potatoes, 9 TX Apples, 9 WA Grapes, 5	**24** CA Potatoes, 7 FL Grapefruit, 8	**25** CA Oranges, 7 FL Grapes, 8 MI Potatoes, 7 TX Bananas, 9 WA Bananas, 5	**26** CA Oranges, 7	**27**
30				

Commodity	Proposed Sampling Dates
Apples:	3rd, 5th, 18th, 19th, 23rd
Bananas:	3rd, 11th, 12th, 17th, 25th
Grapes:	4th, 9th, 10th, 19th, 23rd, 25th
Grapefruit:	4th, 11th, 16th, 17th, 18th, 24th
Lettuce:	3rd, 4th, 5th, 11th, 18th, 19th
Oranges:	10th, 11th, 16th, 25th, 26th
Potatoes:	4th, 11th, 18th, 23rd, 24th, 25th

TOTAL NUMBER OF SAMPLES: 364

APPENDIX A (continued)
PROPOSED STATE SAMPLING PLANS -- OCTOBER 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	1 MI Apples, 7 NY Oranges, 9	**2** CA Grapes, 7 FL Potatoes, 8 TX Potatoes, 9	**3** CA Grapes, 7 NY Grapes, 9	**4**
7 NY Potatoes, 9 TX Grapes, 9	**8** FL Oranges, 8 MI Bananas, 7 MI Lettuce, 7 NY Apples, 9	**9** CA Oranges, 7 FL Apples, 8 TX Lettuce, 9	**10** CA Oranges, 7	**11**
14 TX Oranges, 9	**15** FL Lettuce, 8	**16** CA Potatoes, 7 NY Grapefruit, 9 TX Grapefruit, 9 WA Oranges, 5	**17** CA Potatoes, 7	**18**
21 CA Grapefruit, 7 MI Grapefruit, 7 NY Bananas, 9 TX Apples, 9 WA Grapefruit, 5 WA Bananas, 5	**22** CA Grapefruit, 7 FL Grapes, 8	**23** CA Lettuce, 7 FL Grapefruit, 8 TX Bananas, 9	**24** CA Lettuce, 7	**25**
28 CA Bananas, 7 MI Potatoes, 7 NY Lettuce, 9 WA Grapes, 5	**29** CA Bananas, 7 FL Bananas, 8 WA Apples, 5 WA Lettuce, 5	**30** CA Apples, 7 MI Grapes, 7 MI Oranges, 7 WA Potatoes, 5	**31** CA Apples, 7	

Commodity	Proposed Sampling Dates
Apples:	1st, 8th, 9th, 21st, 29th, 30th, 31st
Bananas:	8th, 21st, 23rd, 28th, 29th
Grapes:	2nd, 3rd, 7th, 22nd, 28th
Grapefruit:	16th, 21st, 22nd, 23rd
Lettuce:	8th, 9th, 15th, 23rd, 24th, 28th, 29th
Oranges:	1st, 8th, 9th, 10th, 14th, 16th, 30th
Potatoes:	2nd, 7th, 16th, 17th, 28th, 30th

TOTAL NUMBER OF SAMPLES: 364

APPENDIX A (continued)
PROPOSED STATE SAMPLING PLANS -- NOVEMBER 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
				1
4 CA Potatoes, 7 TX Potatoes, 9 WA Oranges, 5	5 CA Potatoes, 7 FL Lettuce, 8	6 CA Oranges, 7 FL Oranges, 8 MI Bananas, 7 MI Oranges, 7 NY Grapefruit, 9 TX Grapes, 9 WA Bananas, 5	7 CA Oranges, 7	8
11	12 CA Lettuce, 7 FL Apples, 8 FL Potatoes, 8 MI Grapes, 7 NY Oranges, 9 TX Lettuce, 9 WA Grapefruit, 5	13 CA Lettuce, 7 NY Potatoes, 9 TX Oranges, 9 WA Potatoes, 5	14 CA Bananas, 7	15 CA Bananas, 7
18 CA Grapefruit, 7 NY-Lettuce, 9 TX-Grapefruit, 9 WA-Lettuce, 5	19 CA Grapefruit, 7 FL Grapes, 8 FL Grapefruit, 8 TX Apples, 9	20 CA Apples, 7 FL Bananas, 8 MI Potatoes, 7 NY Apples, 9 TX Bananas, 9	21 CA Apples, 7 MI Lettuce, 7	22
25 CA Grapes, 7 MI Grapefruit, 7 NY Bananas, 9 WA Grapes, 5	26 CA Grapes, 7 MI Apples, 7 NY Grapes, 9 WA Apples, 5	27	28	29

Commodity	Proposed Sampling Dates
Apples:	12th, 19th, 20th, 21st, 26th
Bananas:	6th, 14th, 15th, 20th, 25th
Grapes:	6th, 12th, 19th, 25th, 26th
Grapefruit:	12th, 18th, 19th, 25th
Lettuce:	5th, 12th, 13th, 18th, 21st
Oranges:	4th, 6th, 12th, 13th
Potatoes:	4th, 5th, 12th, 13th, 20th

TOTAL NUMBER OF SAMPLES: 364

APPENDIX A (continued)
PROPOSED STATE SAMPLING PLANS -- DECEMBER 1991

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
2 CA Lettuce, 7 NY Potatoes, 9 TX Potatoes, 9 WA Grapes, 5	**3** CA Lettuce, 7 FL Potatoes, 8 FL Grapes, 8 MI Oranges, 7 TX Grapes, 9	**4** CA Apples, 7 FL Grapefruit, 8 MI Apples, 7 NY Grapefruit, 9 TX Lettuce, 9 WA Potatoes, 5	**5** CA Apples, 7 MI Potatoes, 7	**6**
9 CA Grapes, 7 MI Bananas, 7 TX Oranges, 9 WA Lettuce, 5	**10** CA Grapes, 7 FL Oranges, 8 NY Grapes, 9	**11** CA Potatoes, 7 FL Bananas, 8 MI Grapefruit, 7 NY Bananas, 9 TX Grapefruit, 9 WA Apples, 5	**12** CA Potatoes, 7	**13**
16 CA Oranges, 7 MI Grapes, 7 TX Apples, 9 WA Bananas, 5	**17** CA Oranges, 7 FL Lettuce, 8 FL Apples, 8 NY Apples, 9	**18** CA Bananas, 7 MI Lettuce, 7 TX Bananas, 9 WA Grapefruit, 5	**19** CA Bananas, 7 NY Lettuce, 9	**20**
23	**24**	**25**	**26**	**27**
30 CA Grapefruit, 7 NY Oranges, 9 WA Oranges, 5	**31** CA Grapefruit, 7			

Commodity	Proposed Sampling Dates
Apples:	4th, 5th, 11th, 16th, 17th
Bananas:	9th, 11th, 16th, 18th, 19th
Grapes:	2nd, 3rd, 9th, 10th, 16th
Grapefruit:	4th, 11th, 18th, 30th, 31st
Lettuce:	2nd, 3rd, 4th, 9th, 17th, 18th, 19th
Oranges:	3rd, 9th, 10th, 16th, 17th, 30th
Potatoes:	2nd, 3rd, 4th, 5th, 12th

TOTAL NUMBER OF SAMPLES: 364

APPENDIX B
DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE
May-December 1991

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
	ACEPHATE*		Total of positives = 3		
Nov-Dec	Apples (v)	90	1	1.1	17 B
Nov-Dec	Bananas	97	0	0	0
Nov-Dec	Grapefruit	97	0	0	0
Nov-Dec	Grapes	90	0	0	0
Nov-Dec	**Lettuce***	104	2	1.9	21 B
Nov-Dec	Oranges	90	0	0	0
Nov-Dec	Potatoes	97	0	0	0
	CHLORPYRIFOS*		Total of positives = 36		
Sept-Dec	**Apples***	197	31	15.7	28 B
Sept-Dec	**Bananas***	197	0	0	0
Aug-Dec	**Grapefruit***	250	2	0.8	25 B
May-Dec	**Grapes***	328	0	0	0
May-Dec	Lettuce (v)	351	1	0.3	50 B
Aug-Dec	**Oranges***	242	2	0.8	0.24 M
May-Dec	Potatoes	336	0	0	0
	DICLORAN*		Total of positives = 52		
Sept-Dec	Apples	197	0	0	0
Sept-Dec	Bananas	197	0	0	0
Aug-Dec	Grapefruit	250	0	0	0

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
DICLORAN* (continued)					
May-Dec	**Grapes***	328	48	14.6	0.24 M
May-Dec	**Lettuce***	351	2	0.6	63 B
Aug-Dec	Oranges	242	0	0	0
May-Dec	**Potatoes***	336	2	0.6	60 B
DICOFOL*		Total of positives = 16			
Aug-Dec	**Apples***	197	3	1.5	0.29 M
Aug-Dec	Bananas	197	0	0	0
Aug-Dec	**Grapefruit***	250	0	0	0
Aug-Dec	Grapes	245	11	4.5	0.21 M
Aug-Dec	Lettuce	258	0	0	0
Aug-Dec	**Oranges***	242	2	0.8	48 B
Aug-Dec	Potatoes	249	0	0	0
HCB* (Hexachlorobenzene)		Total of positives = 0			
Sept-Dec	Apples	197	0	0	0
Sept-Dec	**Bananas***	197	0	0	0
Aug-Dec	Grapefruit	250	0	0	0
May-Dec	Grapes	328	0	0	0
May-Dec	Lettuce	351	0	0	0
Aug-Dec	Oranges	242	0	0	0
May-Dec	Potatoes	336	0	0	0

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
IPRODIONE*			Total of positives = 51		
Sept-Dec	Apples(v)	197	1	0.5	0.18 M
Sept-Dec	Bananas	197	0	0	0
Aug-Dec	Grapefruit	250	0	0	0
May-Dec	**Grapes***	328	50	15.2	0.28 M
May-Dec	**Lettuce***	351	0	0	0
Aug-Dec	Oranges	242	0	0	0
May-Dec	Potatoes	343	0	0	0
LINDANE*			Total of positives = 1		
Sept-Dec	Apples	197	0	0	0
Sept-Dec	Bananas	197	0	0	0
Aug-Dec	Grapefruit	250	0	0	0
May-Dec	Grapes	328	1	0.3	34 B
May-Dec	**Lettuce***	351	0	0	0
Aug-Dec	Oranges	242	0	0	0
May-Dec	Potatoes	336	0	0	0
METHAMIDOPHOS*			Total of positives = 1		
Nov-Dec	Apples	90	0	0	0
Nov-Dec	Bananas	97	0	0	0
Nov-Dec	Grapefruit	97	0	0	0
Nov-Dec	Grapes	90	0	0	0
Nov-Dec	**Lettuce***	104	1	1.0	43 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
METHAMIDOPHOS* (continued)					
Nov-Dec	Oranges	90	0	0	●
Nov-Dec	**Potatoes***	97	0	0	0
METHOXYCHLOR*		Total of positives = 2			
Sept-Dec	**Apples***	197	2	1.0	0.15 M
Sept-Dec	Bananas	197	0	0	0
Aug-Dec	Grapefruit	250	0	0	0
May-Dec	**Grapes***	328	0	0	0
May-Dec	Lettuce	351	0	0	0
Aug-Dec	Oranges	242	0	0	0
May-Dec	Potatoes	336	0	0	0
PERMETHRINS*		Total of positives = 33			
Sept-Dec	**Apples***	197	0	0	0
Sept-Dec	Bananas	197	0	0	0
Aug-Dec	Grapefruit	250	0	0	0
Sept-Dec	Grapes	328	0	0	0
May-Dec	**Lettuce***	351	33	9.4	0.58 M
Aug-Dec	Oranges	242	0	0	0
May-Dec	**Potatoes***	336	0	0	0
QUINTOZENE* (PCNB)		Total of positives = 4			
Sept-Dec	Apples	197	0	0	0
Sept-Dec	**Bananas***	197	0	0	0
Aug-Dec	Grapefruit	250	0	0	0

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
QUINTOZENE* (PCNB) (continued)					
May-Dec	Grapes	328	0	0	0
May-Dec	Lettuce	351	0	0	0
Aug-Dec	Oranges	242	0	0	0
May-Dec	Potatoes	336	4	1.2	7 B
OTHER PESTICIDES					
AZINPHOS METHYL			Total of positives = 14		
Nov-Dec	Apples	90	14	15.6	0.10 M
CAPTAN			Total of positives = 23		
Sept-Dec	Apples	197	17	8.6	86 B
May-Dec	Grapes	328	4	1.2	0.21 M
May-Dec	Potatoes	336	2	0.6	0.20 M
CHLORPROPHAM			Total of positives = 60		
May-Dec	Potatoes	336	60	17.9	1.11 M
DCPA			Total of positives = 9		
Aug-Dec	Lettuce	258	9	3.5	21 B
pp'-DDD			Total of positives = 1		
May-Dec	Potatoes	336	1	0.3	3 B
pp'-DDE			Total of positives = 14		
Aug-Dec	Lettuce	258	3	1.2	20 B
May-Dec	Potatoes	336	11	3.3	13 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
pp'-DDT			Total of positives = 2		
Jun-Dec	Potatoes	324	2	0.6	19 B
DIAZINON			Total of positives = 3		
Sept-Dec	Apples	197	1	0.5	35 B
Nov-Dec	Lettuce	97	1	1.0	57 B
Jun-Dec	Potatoes	324	1	0.3	7 B
DIMETHOATE			Total of positives = 8		
Nov-Dec	Apples	90	7	7.8	0.12 M
Nov-Dec	Grapes	90	1	1.1	0.25 M
ENDOSULFAN I AND II			Total of positives = 23		
Nov-Dec	Apples	90	8	7.8	29 B
Aug-Dec	Grapes	245	8	3.3	36 B
Jun-Dec	Potatoes	324	3	0.9	13 B
Oct-Dec	Lettuce	156	5	3.2	60 B
ENDOSULFAN SULFATE			Total of positives = 29		
Nov-Dec	Apples	90	1	4.4	12 B
Aug-Dec	Grapes	245	4	1.6	26 B
Oct-Dec	Lettuce	156	5	3.2	64 B
Jun-Dec	Potatoes	324	16	4.9	22 B
ETHION			Total of positives = 6		
Nov-Dec	Apples	90	1	1.1	0.36 M
Sept-Dec	Grapefruit	197	1	0.5	12 B
Sept-Dec	Oranges	194	4	2.1	10 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
IMAZALIL			Total of positives = 50		
Aug-Dec	Grapefruit	250	22	8.8	0.15 M
Aug-Dec	Oranges	242	28	11.6	0.15 M
MALATHION			Total of positives = 3		
Nov-Dec	Oranges	90	3	3.3	60 B
METHIDATHION			Total of positives = 2		
Aug-Dec	Oranges	242	2	0.8	12 B
METHYL PARATHION			Total of positives = 2		
Oct-Dec	Apples	149	2	1.3	97 B
MYCLOBUTANIL			Total of positives = 20		
Jul-Dec	Grapes	295	20	6.8	88 B
PCP- METHYLSULFIDE (c)			Total of positives = 1		
Sept-Dec	Potatoes	194	1	0.5	10 B
PENTACHLOROANILINE (c)			Total of positives = 1		
Sept-Dec	Potatoes	194	1	0.5	50 B
PENTACHLOROBENZENE			Total of positives = 1		
Sept-Dec	Potatoes (v)	194	1	0.5	30 B
PHOSMET			Total of positives = 6		
Sept-Dec	Apples	197	5	2.5	0.18 M
Nov-Dec	Grapes	90	1	1.1	39 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
THIABENDAZOLE (d)			Total of positives = 29		
Aug-Oct, Dec	Grapefruit	28	16	57.1	90 B
Aug-Oct	Oranges	21	13	61.9	0.26 M
VINCLOZOLIN			Total of positives = 5		
May-Dec	Grapes	328	5	1.5	0.12 M
TOTAL PESTICIDES FOUND = 511 **TOTAL SAMPLES ANALYZED = 1901****					

* Pesticide/commodity pairs of interest to EPA.

** **Does not** include the State of Michigan samples for the following:
November -- apples, grapefruits, grapes, and oranges.
December -- apples, bananas, grapes, oranges, and potatoes.

(a) Samples for which pesticide residues were detected.

(b) The mean value of the concentrations reported. It does not include samples where these pesticides were not detected.

(c) PCNB metabolites.

(d) Thiabendazole determinations only apply to Michigan samples.

(v) Violation: residues found where tolerance was not established.

B Parts per billion.

M Parts per million.

APPENDIX C
USE AND TOXICOLOGY OF PESTICIDES DETECTED

ACEPHATE

Introduced by Chevron Chemical Company in 1971 under the trademark Orthene, Acephate is a contact and systemic insecticide effective against aphids, thrips, leafminers and many other insects. It is used on various crops such as lettuce, celery, cotton, cranberries, soybeans, peanuts, etc. Acephate is a weak cholinesterase inhibitor classified as a possible human carcinogen. It has a relatively low acute toxicity and shows no mutagenic or teratogenic effects in laboratory animals.

AZINPHOS-METHYL

Azinphos-methyl was introduced in 1953 by Bayer Leverkusen under the trade names of Gusathion M and Guthion. It is a non-systemic insecticide and acaricide of long persistence used on fruit and field crops, vegetables, tobacco, and ornamentals. Azinphos-methyl is an acutely toxic organophosphate cholinesterase inhibitor. No information is available on the mutagenicity, teratogenicity, or reproductive effects of this compound, and the oncogenic effects are still being evaluated.

CAPTAN

Captan was introduced in 1949 by the Standard Oil Co. and later by Chevron Chemical Co. It is also marketed under the trade names Merpan, Orthocide, SR-406, and Vancide 89. Captan is a fungicide used mainly for foliage protection on a wide range of fruits, vegetables, and field crops (e.g., apple, orange, broccoli, celery, corn, soybean, wheat, etc.). Captan has shown toxic effects in reproduction and mixed mutagenic effects (i.e., positive and negative effects). Captan has been classified as a probable carcinogen because animal studies showed carcinogenic effects at high doses.

CHLORPROPHAM

Introduced in 1951 as a weed killer under the trade names Chloro-IPC or CIPC and manufactured by Pennwalt Holland B.V., Universal Crop Protection Ltd. and Platte Chemical Co., Chlorpropham is a herbicide and plant growth regulator used on terrestrial food and non-food crops and ornamentals. Not enough information is available on the subchronic toxicity, oncogenicity, or mutagenicity of Chlorpropham.

CHLORPYRIFOS

Introduced in 1965 by Dow Chemical, Chlorpyrifos is marketed under the names of Dursban and Lorsban. Chlorpyrifos is effective against a wide variety of insects including aphids, armyworms, grasshoppers, and fire ants, on field, fruit, and vegetable crops. Presently, it is

not considered to be oncogenic, mutagenic, or teratogenic although additional information is still pending.

DCPA

Introduced in 1958, and produced in the U.S. by Fermenta Plant Protection Company, DCPA is also marketed as Dachtal, Chlorothal, and Chlorothal-dimethyl. DCPA is a herbicide used to control annual grasses and certain annual broadleaf species on terrestrial food and non-food crops. Presently, there are no chronic toxicological concerns for exposures to DCPA itself; however, there are concerns for the chronic toxicological effects of the two manufacturing impurities 2,3,7,8-TCDD and HCB.

DIAZINON

Introduced in 1952 by J.R. Geigy, and marketed under the names Spectracide, AG500, Alfa-tox, Sarolex, D-Z-N Diazinon 14G, etc., Diazinon is an organophosphate, non-systemic insecticide with some acaricidal action. It is used on field, fruit, nut, and vegetable crops. Diazinon has shown some mutagenic effects, mixed teratogenic effects, and no carcinogenic effects.

DICLORAN

Registered by Upjohn Inc. under the trademark of Botran, Dicloran is a protectant fungicide effective against a wide range of fungal pathogens (e.g., Botrytis, Monilinia, Rhizopus, Sclerotinia, and Sclerotum species). It is used on fruit, vegetable, berry, and ornamental cultivations, and also as a seed treatment for onions and leeks. No human toxicological hazards of concern other than skin photosensitivity have been associated with this compound. Carcinogenicity, mutagenicity, and teratogenicity studies are still ongoing.

DDT-$\rho\rho$'

DDT is a mixture of isomers of which ρ,ρ'-DDT is the predominant component. DDT is a potent non-systemic insecticide widely used in the 1940's until it was discovered that it accumulates in the fatty tissue of warm blooded animals and is highly persistent in the environment. All uses in the U.S. have been cancelled since 1973, with the exception of emergency public health and a very few other uses permitted on a case-by-case basis. DDT is found as a contaminant of Dicofol.

DDE-$\rho\rho$'

DDE is a product of degradation of DDT and is found as a contaminant of Dicofol.

DICOFOL

Introduced in 1955 by the Rohm & Haas Company under the trade name Kelthane, Dicofol is a non-systemic acaricide with little insecticidal activity. It is recommended for the control of

mites on a wide range of crops (e.g., apples, cucumbers, tomatoes, lettuce, etc.). Dicofol is not mutagenic and its carcinogenic effects are still under evaluation. No information is available on its reproductive or teratogenic effects. DDT and DDE are contaminants of Dicofol.

DIMETHOATE

Introduced in 1956 by the American Cyanamid Company under the trade names Cygon and Dimetate, Dimethoate is an organophosphate systemic insecticide used to kill mites, aphids, and other insects on fruit and vegetable crops. It is also used to control house flies around farm buildings. Dimethoate is possibly a human teratogen, a mutagen, and a carcinogen. No reproductive effects have been shown in humans.

ENDOSULFAN I, II, & SULFATE

Introduced in 1956 by Hoechst AG under the trade name Thiodan, endosulfan is a chlorinated hydrocarbon insecticide used as a non-systemic contact poison on aphids, thrips, and other insects. Laboratory animal studies indicate that Endosulfan is acutely toxic at high doses, although the toxicity appears to be influenced by the solvents and emulsifiers used as carriers. No carcinogenic, mutagenic, teratogenic, or reproductive effects were observed.

ETHION

Manufactured in the U.S. by the FMC Corporation, Ethion is an organophosphate non-systemic insecticide used to control leaf-feeding insects, mites, and scale. Ethion is mainly used on citrus (86-89 percent of total usage), cotton, and a variety of fruit and nut trees. It is highly toxic to mammals, particularly to females. As other organophosphates, Ethion is a cholinesterase inhibitor. No carcinogenic, teratogenic, or mutagenic effects have been associated with Ethion.

HEXACHLOROBENZENE (HCB)

HCB is also known as Perchlorobenzene. It was first marketed in 1945 for seed treatment and was used as a selective fungicide. Use of HCB on food products is prohibited in the U.S. and in most countries because of concerns about its carcinogenic effects and its tendency to bioaccumulate in animal fatty tissue. HCB is found as a contaminant of other registered pesticides (e.g., DCPA, Pentachloronitrobenzene, Chlorothalonil, Picloram, and Pentachlorophenol).

IMAZALIL

Manufactured by Janssen Pharmaceutical, Imazalil is a systemic fungicide used as a wheat and barley treatment for common root rot and associated seedling diseases. It is also used to prevent post-harvest decay of citrus, banana, and pome fruits. Animal studies on the reproductive, mutagenic, carcinogenic, and teratogenic effects of Imazalil have yielded negative results.

IPRODIONE

Iprodione is also known as glycophene and is manufactured by Rhone-Poulenc under the trademark of Rovral. It is used as a preventive action fungicide, inhibiting spore germination and growth of fungal mycellium on fruits and vegetables. Iprodione does not exhibit carcinogenic, teratogenic, or mutagenic properties.

LINDANE

Manufactured by Rhone Poulenc and Drexel Chemical Co., Lindane is used as a foliar spray to control a broad spectrum of insects on tobacco, fruits, and vegetables. Lindane is classified as a possible human carcinogen. It does not exhibit reproductive, mutagenic, or teratogenic properties.

MALATHION

Introduced in 1950 by American Cyanamid Company, Malathion is an organophosphate insecticide used to control aphids, spider mites, scale insects, and other insects attacking fruits, vegetables, ornamentals, and stored products. No information is available on the reproductive, mutagenic, teratogenic, or oncogenic effects of Malathion.

METHAMIDOPHOS

Manufactured by Chevron, Inc. since 1969 under the trademarks of Tamaron and Monitor, Methamidophos is an effective contact and systemic insecticide and acaricide. It is used to control aphids on many types of fruits and vegetables including, cucumbers, melons, and peppers. Methamidophos is highly toxic by the oral and dermal routes but it does not exhibit oncogenic or teratogenic properties. Its reproductive and mutagenic effects are still under evaluation.

METHIDATHION

Manufactured by Ciba-Geigy, this non-systemic insecticide controls a wide range of sucking and leaf-eating insects on fruits and field crops. Methidathion has a high acute toxicity but it does not exhibit carcinogenic, teratogenic, mutagenic, or reproductive effects.

METHOXYCHLOR

Manufactured by Drexel Chemical Co., Kincaid Enterprises, and Prentiss Drug & Chemical Co., Methoxychlor is used to control a wide range of insects encountered in agriculture, households, and industrial sites. The mutagenic, carcinogenic, reproductive, and mutagenic effects of Methoxychlor are still under evaluation.

METHYL PARATHION

Introduced in 1949 by Bayer Leverkusen and manufactured in the U.S. by Monsanto Chemical Company, Methyl Parathion is an organophosphate insecticide used to control a wide variety of biting and sucking insects on fruit, vegetable, nut, and field crops, tobacco and ornamentals, forestry, and aquatic food crops. Methyl Parathion is a cholinesterase inhibitor highly toxic to mammals. Oncogenic and teratogenic effects are still being evaluated. No mutagenic or reproductive effects have been linked to use of Methyl Parathion.

MYCLOBUTANIL

Also known as Systhane, Myclobutanil is manufactured by Rohm & Haas Company. Myclobutanil is a systemic fungicide used on apples, grapes, peaches, nectarines and cherries for the control of many fungi (e.g., Ascomycetes, Deuteromycetes, and Basidiomycetes). Myclobutanil has a moderate to low acute toxicity. Animal studies showed some reproductive effects at high doses. Oncogenic, mutagenic, and teratogenic studies showed negative results.

METHYL PCP SULFIDE, PENTACHLOROANILINE, PENTACHLOROBENZENE

Metabolites of Quintozene (PCNB).

PERMETHRIN

Cis/trans Permethrin is a synthetic pyrethroid and the ratio of the isomers is dependent on the manufacturing process. Permethrin is a contact pesticide with greater resistance to photo degradation than the natural pyrethrins. Its activity in sunlight can last for up to 12 weeks and is effective against many of the common plant insects, such as caterpillars and aphids. Permethrin also degrades rapidly in soil and water. Permethrin does not exhibit any carcinogenic properties.

PHOSMET

Manufactured by the Stauffer Chemical Company, Phosmet is an organophosphate insecticide used on vegetable, fruit, and field crops for the control of a wide variety of insects, which include alfalfa weevil, boll weevil, oriental fruit moth, and leafrollers. Phosmet has a moderate to low acute toxicity, is considered a "tentative" carcinogen although further studies are pending, and its mutagenic effects are still under evaluation. Phosmet does not exhibit teratogenic or mutagenic effects

QUINTOZENE (PCNB)

Quintozene or Pentachloronitrobenzene (PCNB) was introduced in the late 1930's by Hoechst AG, and is currently manufactured by AMVAC Chemical Corp., Uniroyal Chemical Co.,

and others. Quintozene is used on vegetable crops and ornamentals as a soil fungicide and seed dressing agent. Carcinogenic and teratogenic effects were observed in studies conducted on PCNB containing 11 percent of HCB as manufacturing impurity, therefore, new studies are being required. No mutagenic or reproductive effects were observed.

THIABENDAZOLE

Manufactured by Merck & Co., Inc., Thiabendazole is also sold under the trade names TBZ, Mertec, Tecto, and Thibenzole. Thiabendazole is a systemic fungicide used on fruit and vegetable crops for the control of diseases such as mold, rot, blight, and stain. No carcinogenic or mutagenic effects have been attributed to Thiabendazole, however, some animal studies have shown reproductive and teratogenic effects at high doses.

VINCLOZOLIN

Introduced in 1975 by BASF AG, Vinclozolin is a selective fungicide effective against Botrytis cinerea, Monilia spp, and Sclerotinia sclerotiorum and developed for use in vines, fruits, hops, and ornamentals. Vinclozolin causes moderate skin irritation. No other toxic effects have been attributed to this chemical.

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1991

PESTICIDE DATA PROGRAM

Calendar Year 1991 Report

ADDENDUM

Agricultural Marketing Service

U.S. Department of Agriculture

United States Department of Agriculture
Agricultural Marketing Service
P.O. Box 96456
Washington, DC
20090-6456

April 1992

To the Reader:

The Agricultural Marketing Service of the United States Department of Agriculture in May 1991, implemented the Pesticide Data Program to collect objective, comprehensive data on pesticide residues for fresh fruit and vegetables. This program was submitted to Congress as part of the President's 1991 budget to address the increased interest in food safety by producers and consumers.

This program was designed to provide government agencies with an improved data base to respond more effectively to food safety issues. The primary recipient of the program's data will be the Environmental Protection Agency, which will use this information to support its risk assessment process.

The enclosed report provides residue data for the last 8 months of calendar year 1991. This program has been funded by Congress and is operated through cooperatives agreements with six participating States. These States, California, Florida, Michigan, New York, Texas, and Washington, have the responsibility for sample collection and residue analysis.

The program was expanded in 1992 to include additional commodities and pesticide classes. This information will be reflected in future reports.

This is an addendum report to update sample results which were not reported in the March 1991 report. We welcome comments regarding this report. Comments should be addressed to:

Dr. Craig A. Reed, Director
Science Division
Agricultural Marketing Service
U.S. Department of Agriculture
P.O. Box 96456 (Room 3064S)
Washington, DC 20090-6456

USDA
The Agricultural Marketing Service
is an agency of the
United States Department of Agriculture

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Addendum Report

EXECUTIVE SUMMARY

The Agricultural Marketing Service (AMS) of the United States Department of Agriculture (USDA) began the residue testing program in May 1991 as part of USDA's Pesticide Data Program (PDP). This program collects actual concentration levels of pesticide residues in fresh fruit and vegetables close to the consumer level while retaining product origin. The PDP program is a result of President Bush's 1989 Food Safety Proposal, and has been funded by Congress for 2 years. AMS developed PDP's policy and operations procedures and residue testing priorities in close cooperation with the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). These data are to be used by EPA for pesticide risk assessment and serve as an initial data base for national residue testing so that government agencies can respond more effectively to food safety issues.

The residue monitoring program is being implemented in stages based on the data needs expressed by EPA. The data presented in this report reflect the first stages of that plan. The sample collections and analyses were conducted by six participating States: California, Florida, Michigan, New York, Texas, and Washington. These States represent diverse geographic regions, approximately 40 percent of the Nation's population, and a large segment of the fresh fruits and vegetables grown in the U.S.

Testing began in mid-May 1991 with three commodities -- grapes, lettuce, and potatoes. By September 1991, apples, bananas, grapefruit, and oranges were added. Analysis began with 8 chlorinated pesticides of interest to EPA and expanded to include organophosphate pesticide analysis for a total of 11 pesticides of interest to EPA by November 1991. This includes 24 of the 88 pesticide/commodity pairs of EPA interest -- excluding methyl bromide. By the end of the calendar year, 34 different pesticide residues were detected.

A total of 1,963 samples, apportioned by State population, were collected in the 6 States. These samples were collected at random from terminal produce markets and chain store distribution centers. States provided quarterly sampling plans based on AMS's quarterly program plan for commodities and pesticides to be tested. Every State identified a random date each month for collecting all samples for a commodity from different sites. This procedure enabled the laboratories to provide the necessary quality control criteria to ensure the integrity and reliability of the data. Sample origin was from the 6 participating States, 27 additional States, and 13 countries.

At the laboratory, samples were examined for acceptability for analysis. Only the edible portions of the products were prepared, employing procedures similar to those consumers would use, and analyzed. Each laboratory used its current analytical procedures, but was required to meet PDP quality control (QC) standards necessary to demonstrate equivalency of data for the 11 pesticides of interest to EPA, and for reporting other detected pesticides.

The QC requirements included a list of pesticide detection levels, laboratory capability studies, and rigorous QC controls with each set of samples tested. In addition, all laboratories participated in a proficiency testing program to demonstrate performance and determine laboratory capability on unknown samples.

A total of 1,963 samples were analyzed. There were 450 samples (23 percent) with detectable levels of pesticide residues, i.e., "positive samples." The percentage of positive samples varied by commodity as follows: apples (36 percent), grapes (35 percent), potatoes (27 percent), oranges (23 percent), lettuce (17 percent), grapefruit (17 percent), and none in bananas. There were four violations from four different States for pesticide residues having no commodity tolerances. Ten of the 11 pesticides of interest to EPA were detected (the exception being hexachlorobenzene) and covered 13 pesticide/commodity pairs. Two pesticide/commodity pairs, dicloran and iprodione in grapes, were detected in samples collected in all six States.

There were 547 pesticide residues detected in the 1,963 samples analyzed. These pesticide residues represented 34 different chlorinated and/or organophosphate pesticides of which 207 (38 percent) were of interest to EPA. The number of pesticide/commodity pairs showing the greatest percentage of findings were: iprodione/grapes (15.5 percent), dicloran/grapes (14.6 percent), chlorpyrifos/apples (16.1 percent), permethrins/lettuce (9.4 percent). Most of the residues were detected at levels substantially below tolerance levels. A tolerance is the amount of pesticide residue permitted on agricultural products in the USA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Other pesticide/commodity pairs showing large detection percentages were: chlorpropham/potatoes (17.5 percent), azinphos methyl/apples (13.5 percent), captan/apples (8.1 percent), and thiabendazole in citrus (65.7 percent)--applicable only to Michigan samples. Imazalil, a post harvest fungicide, was detected in 11.5 percent of the citrus products tested.

The significance of the residue findings will be determined by EPA's risk assessment process. See Appendix C for uses and toxicology for each pesticide.

4.0 SAMPLE RESULTS

In 1991, a total of 1,963 samples were collected. All samples were analyzed according to the pesticide testing plans for each month. From May through December 1991, these pesticides were: chlorpyrifos, dicloran, hexachlorobenzene (HCB), iprodione, lindane, methoxychlor, permethrins, and quintozene (PCNB). In October 1991, dicofol was added as part of the testing profile for all 6 States, and in November 1991, acephate and methamidophos were added for a total of 11 pesticides. In addition, 24 other pesticides were detected, however, capability for detection and detection limits varied by State, as shown in Table 3.1. Ten of these pesticides were added as part of the testing profile in October 1991, for all State laboratories based on the following selected commodities:

Grapes:	Captan, endosulfan I, II and sulfate, myclobutanil, and vinclozolin
Grapefruit:	Imazalil
Oranges:	Imazalil
Lettuce:	DCPA
Potatoes:	Chlorpropham (CIPC), and p,p' DDE

Thirteen additional pesticides listed in Table 4.1 were detected in at least one of the seven commodities tested after October 1, 1991, and listed by State in Table 4.2. Michigan had the capability of detecting thiabendazole using a multiresidue screen by employing mass spectrometry detection. In Table 4.2, the only pesticide/commodity pairs from EPA list detected in all six States were dicloran and iprodione in grapes. Chlorpropham in potatoes was reported in all States except Florida.

There were a total of 450 samples, 23 percent, having pesticide residues. This ranges from 77 out of 211 samples, 36 percent, with 15 different residues for apples, to bananas, where no residues were detected. The descending order of the percentage of samples in which residues were detected in the other 5 commodities are: grapes (35 percent), potatoes (27 percent), oranges (23 percent), lettuce (17 percent), and grapefruit (17 percent). Ten of the 11 pesticides of initial interest to EPA were detected in at least one commodity, except for HCB. Of the 24 pesticide/commodity pairs in Table 1.1, 13 pairs had at least one sample which contained a detectable level of pesticide residue, i.e., a positive sample.

There were four violations, listed in Table 4.1. They were iprodione and acephate in apples, chlorpyrifos in lettuce, and pentachlorobenzene in potatoes. In all cases, there were no established tolerances for that particular commodity and pesticide shown in Table 4.2, and each of them was from a different State.

Appendix B is a compilation of total pesticide residues detected. In all there were 547 residue findings representing 34 different pesticides in the 1,963 samples analyzed. For the 11 pesticides on the EPA list, there were 207 residue findings. Appendix B lists all of the pesticides detected by total number of samples, number of positive findings, percent of positive samples, and mean value of the residue detected. For the 11 pesticides on the initial test list, all results were listed, even if residues were not detected. For the other pesticides reported, only those commodities where residues were detected are listed.

The pesticide/commodity pairs from the EPA list showing the largest number/percentage of pesticide detections were: iprodione/grapes (53/15.5 percent), dicloran/grapes (50/14.6 percent), chlorpyrifos/apples (34/16.1 percent), and permethrins/lettuce (33/9.4 percent). The mean residue concentration detected were respectively; 0.28 ppm, 0.21 ppm, 38 ppb, 0.58 ppm. These 4 pairs accounted for 170 or 82 percent of the 207 residue findings for the 11 pesticides of initial EPA interest.

For the other pesticides reported by commodity, the most prevalent pesticides detected in apples were azinphos methyl in 13.5 percent of the samples with a mean concentration of 0.10 ppm, applicable to apples collected after October 31, 1991, and captan in 8.1 percent of the samples with a mean concentration of 86 ppb. In potatoes, chlorpropham (CIPC) was detected in 17.5 percent of the samples tested from May 1991, with a mean concentration of 1.11 ppm. Michigan detected thiabendazole in approximately 65.7 percent of the citrus fruit tested.

Appendix C is a use and toxicology profile of the pesticides. These pesticides were either in the testing plans or detected in commodities tested in 1991. They covered a wide spectrum of use compounds from insecticides, fungicides, post-harvest fungicides, herbicides, acaricides, manufacturing impurities, and metabolites of compounds included in the testing profile.

TABLE 4.1
DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

PESTICIDES DETECTED	NUMBER OF SAMPLES ANALYZED	NUMBER OF POSITIVE SAMPLES	PERCENT OF POSITIVE SAMPLES
APPLES			
Acephate (v) Azinphosmethyl Captan **Chlorpyrifos*** Diazinon **Dicofol*** Dimethoate Ethion Endosulfan I & II Endosulfan Sulfate Iprodione (v) **Methoxychlor*** Methyl Parathion Phosmet	211	77	36
Total = 15			
BANANAS			
None	203	0	0
Total = 0			
GRAPEFRUIT			
Chlorpyrifos* Ethion Imazalil Thiabendazole	257	44	17
Total = 4			

TABLE 4.1 (continued)

PESTICIDES DETECTED	NUMBER OF SAMPLES ANALYZED	NUMBER OF POSITIVE SAMPLES	PERCENT OF POSITIVE SAMPLES
GRAPES			
Captan **Dicloran*** Dimethoate Dicofol Endosulfan I & II Endosulfan Sulfate **Iprodione*** Lindane Myclobutanil Vinclozolin	328	113	34
Total = 11			
LETTUCE			
Acephate* Chlorpyrifos (v) DCPA Diazinon **Dicloran*** DDE Endosulfan I & II Endosulfan Sulfate **Methamidophos*** **Permethrins***	351	59	17
Total = 11			
ORANGES			
Chlorpyrifos* Dicofol Ethion Imazalil Malathion Methidathion Thiabendazole	242	46	19
Total = 7			

TABLE 4.1 (continued)

PESTICIDES DETECTED	NUMBER OF SAMPLES ANALYZED	NUMBER OF POSITIVE SAMPLES	PERCENT OF POSITIVE SAMPLES
POTATOES			
Captan Chlorpropham DDD DDE DDT Diazinon **Dicloran*** Ethion Endosulfan I & II Endosulfan Sulfate Quintozene PCP Methylsulfide Pentachloroaniline Pentachlorobenzene(v)	343	91	27
Total = 15			

PESTICIDES DETECTED TOTAL	SAMPLES ANALYZED TOTAL (a)	POSITIVE SAMPLES TOTAL (b)	PERCENT OF POSITIVE SAMPLES
34	1,963	450	23

* Pesticide/commodity pairs of interest to EPA.
(a) More than one residue may have been detected in some of the positive samples.
(v) Violation: residues found where no tolerance was established.

TABLE 4.2
RESIDUE CONCENTRATION LEVELS AND STATE DISTRIBUTION

PESTICIDE	COMMODITY	STATES	MIN.	MAX.	TOLERANCE (ppm)**
Acephate*	Apples(v)	TX	17 B	17 B	None
	Lettuce*	CA, NY	6 B	30 B	10
Azinphos-Methyl	Apples	CA, NY	6 B	0.31 M	2.0
Captan	Apples	FL, NY, TX	10 B	0.17 M	25
	Grapes	NY, TX	16 B	0.57 M	50
	Potatoes	MI	0.17 M	0.23 M	25[1]
Chlorpropham	Potatoes	CA, FL, MI NY, TX	10 B	10 M	50
Chlorpyrifos*	**Apples***	CA, FL, MI NY, TX	3 B	0.21 M	1.5
	Grapefruit*	TX	19 B	30 B	1.0
	Lettuce (v)	CA	50 B	50 B	None[2]
	Oranges*	TX	0.12 M	0.36 M	1.0
DCPA	Lettuce	CA, WA	8 B	30 B	2
pp'-DDE	Potatoes	CA, FL, NY, TX	3 B	27 B	1[3]
	Lettuce	CA, NY	9 B	30 B	0.5[3]
pp'-DDD	Potatoes	FL	3 B	3 B	1[3]
pp'-DDT	Potatoes	FL, NY	6 B	29 B	1[3]
Diazinon	Apples	CA	35 B	30 B	0.5
	Lettuce	CA	57 B	57 B	0.7
	Potatoes	TX	7 B	7 B	0.1
Dicloran*	**Potatoes***	NY, WA	10 B	0.11 M	0.25
	Grapes*	CA,FL,MI, NY,TX,WA	2B	1.3 M	10
	Lettuce*	CA	6 B	0.12 M	10

TABLE 4.2 (continued)

PESTICIDE	COMMODITY	STATES	MIN.	MAX.	TOLERANCE (ppm)**
Dicofol*	**Apples**	CA, NY	59 B	0.60 M	5
	Grapes	CA, FL, NY, TX	4 B	0.46 M	5
	Oranges*	FL	20 B	75 B	10
Dimethoate	Apples	CA, NY	22 B	0.35 M	2
	Grapes	FL	0.25 M	0.25 M	1
Endosulfans	Apples	CA, TX	13 B	56 B	2.0
	Grapes	CA, NY, TX	8 B	0.13 M	2.0
	Lettuce	CA, NY, TX, WA	11 B	0.21 M	2.0
	Potatoes	NY, TX	2 B	16 B	0.2[4]
Endosulfan Sulfate	Apples	CA, NY, TX, WA	10 B	19 B	2.0
	Grapes	CA, NY, TX	10 B	44 B	2.0
	Lettuce	NY, TX, WA	9 B	80 B	2.0
	Potatoes	NY, TX	5 B	98 B	0.2[4]
Ethion	Apples	CA	0.36 M	0.36 M	2.0
	Grapefruit	FL	2 B	2 B	2.0
	Oranges	FL, NY	2 B	24 B	2.0
Imazalil	Grapefruit	MI, NY, TX	11 B	0.30 M	2.0
	Oranges	MI,NY,TX	5 B	0.44 M	10
Iprodione*	Apples (v)	WA	0.18 M	0.18 M	None
	Grapes*	CA,FL,MI, NY,TX,WA	10 B	1.1 M	60.0
Lindane*	Grapes	NY	34 B	34 B	1
Malathion	Oranges	NY	6 B	0.17 M	8
Methidathion	Oranges	FL, NY	4 B	19 B	2.0

PESTICIDE	COMMODITY	STATES	MIN.	MAX.	TOLERANCE (ppm)**
Methamidophos*	**Lettuce***	TX	43 B	43 B	1.0
Methyl Parathion	Apples	CA	43 B	0.15 M	1
Methoxychlor*	**Apples***	FL, WA	60 B	0.24 M	14
Myclobutanil	Grapes	CA, MI, NY, TX	19 B	0.17 M	1.0
PCP-Methylsulfide (a)	Potatoes	FL	10 B	10 B	0.1[5]
Pentachloroaniline (a)	Potatoes	FL	50 B	50 B	0.1[5]
Pentachlorobenzene	Potatoes (v)	FL	30 B	30 B	None
Permethrins* (both)	**Lettuce***	CA, NY, TX, WA	0.11 M	3.3 M	20.0
Phosmet	Apples	CA, NY	11 B	0.44 M	10
	Grapes	NY	39 B	39 B	10
Quintozene* (PCNB)	Potatoes	CA, FL, WA	3 B	40 B	0.1[1]
Thiabendazole	Grapefruit	MI	39 B	0.27 M	10
	Oranges	MI	92 B	0.43 M	10
Vinclozolin	Grapes	FL, NY	33 B	0.27 M	6.0

* Pesticide/ commodity pairs of interest to EPA.
** Tolerances' significant figures as expressed in the 40 CFR, Part 180.
(a) Metabolites of Quintozene (PCNB)
(v) Violation: residues found where tolerances were not established.
1 Interim tolerance.
2 Tolerance not established although there is a pending tolerance listed at 40 CFR Part 180.342.
3 Tolerances for DDT, DDE, DDD as individual or in combination were revoked on 12/24/86. Numbers cited are administrative guidelines/action levels.
4 Negligible residue tolerance.
5 Administrative guidelines.
M Parts per million.
B Parts per billion.

APPENDIX B
DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE
May-December 1991

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
ACEPHATE*			Total of positives = 3		
Nov-Dec	Apples (v)	104	1	1.0	17 B
Nov-Dec	Bananas	103	0	0	0
Nov-Dec	Grapefruit	104	0	0	0
Nov-Dec	Grapes	104	0	0	0
Nov-Dec	Lettuce*	104	2	1.9	21 B
Nov-Dec	Oranges	104	0	0	0
Nov-Dec	Potatoes	104	0	0	0
CHLORPYRIFOS*			Total of positives = 39		
Sept-Dec	Apples*	211	34	16.1	38 B
Sept-Dec	Bananas*	203	0	0	0
Aug-Dec	Grapefruit*	257	2	0.8	25 B
May-Dec	Grapes*	342	0	0	0
May-Dec	Lettuce (v)	351	1	0.3	50 B
Aug-Dec	Oranges*	256	2	0.8	0.24 M
May-Dec	Potatoes	343	0	0	0
DICLORAN*			Total of positives = 54		
Sept-Dec	Apples	211	0	0	0
Sept-Dec	Bananas	203	0	0	0
Aug-Dec	Grapefruit	257	0	0	0

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
DICLORAN* (continued)					
May-Dec	**Grapes***	342	50	14.6	0.26 M
May-Dec	**Lettuce***	351	2	0.6	63 B
Aug-Dec	Oranges	256	0	0	0
May-Dec	**Potatoes***	343	2	0.6	60 B
DICOFOL*		Total of positives = 16			
Aug-Dec	**Apples***	211	3	1.4	0.29 M
Aug-Dec	Bananas	203	0	0	0
Aug-Dec	**Grapefruit***	257	0	0	0
Aug-Dec	Grapes	259	11	4.2	0.21 M
Aug-Dec	Lettuce	258	0	0	0
Aug-Dec	**Oranges***	256	2	0.8	48 B
Aug-Dec	Potatoes	256	0	0	0
HCB* (Hexachlorobenzene)		Total of positives = 0			
Sept-Dec	Apples	211	0	0	0
Sept-Dec	**Bananas***	203	0	0	0
Aug-Dec	Grapefruit	257	0	0	0
May-Dec	Grapes	342	0	0	0
May-Dec	Lettuce	351	0	0	0
Aug-Dec	Oranges	256	0	0	0
May-Dec	Potatoes	343	0	0	0

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
IPRODIONE*			Total of positives = 54		
Sept-Dec	Apples(v)	211	1	0.5	0.18 M
Sept-Dec	Bananas	203	0	0	0
Aug-Dec	Grapefruit	257	0	0	0
May-Dec	**Grapes***	342	53	15.5	0.28 M
May-Dec	**Lettuce***	351	0	0	0
Aug-Dec	Oranges	256	0	0	0
May-Dec	Potatoes	343	0	0	0
LINDANE*			Total of positives = 1		
Sept-Dec	Apples	211	0	0	0
Sept-Dec	Bananas	203	0	0	0
Aug-Dec	Grapefruit	257	0	0	0
May-Dec	Grapes	342	1	0.3	34 B
May-Dec	**Lettuce***	351	0	0	0
Aug-Dec	Oranges	256	0	0	0
May-Dec	Potatoes	343	0	0	0
METHAMIDOPHOS*			Total of positives = 1		
Nov-Dec	Apples	104	0	0	0
Nov-Dec	Bananas	103	0	0	0
Nov-Dec	Grapefruit	104	0	0	0
Nov-Dec	Grapes	104	0	0	0
Nov-Dec	**Lettuce***	104	1	1.0	43 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
METHAMIDOPHOS* (continued)					
Nov-Dec	Oranges	104	0	0	0
Nov-Dec	**Potatoes***	104	0	0	0
METHOXYCHLOR*		Total of positives = 2			
Sept-Dec	**Apples***	211	2	0.9	0.15 M
Sept-Dec	Bananas	203	0	0	0
Aug-Dec	Grapefruit	257	0	0	0
May-Dec	**Grapes***	342	0	0	0
May-Dec	Lettuce	351	0	0	0
Aug-Dec	Oranges	256	0	0	0
May-Dec	Potatoes	343	0	0	0
PERMETHRINS*		Total of positives = 33			
Sept-Dec	**Apples***	211	0	0	0
Sept-Dec	Bananas	203	0	0	0
Aug-Dec	Grapefruit	257	0	0	0
Sept-Dec	Grapes	342	0	0	0
May-Dec	**Lettuce***	351	33	9.4	0.58 M
Aug-Dec	Oranges	256	0	0	0
May-Dec	**Potatoes***	343	0	0	0
QUINTOZENE* (PCNB)		Total of positives = 4			
Sept-Dec	Apples	211	0	0	0
Sept-Dec	**Bananas***	203	0	0	0
Aug-Dec	Grapefruit	257	0	0	0

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
QUINTOZENE* (PCNB) (continued)					
May-Dec	Grapes	342	0	0	0
May-Dec	Lettuce	351	0	0	0
Aug-Dec	Oranges	256	0	0	0
May-Dec	Potatoes	343	4	1.2	7 B
OTHER PESTICIDES					
AZINPHOS METHYL			Total of positives = 14		
Nov-Dec	Apples	104	14	13.5	0.10 M
CAPTAN			Total of positives = 23		
Sept-Dec	Apples	211	17	8.1	86 B
May-Dec	Grapes	342	1	1.2	0.21 M
May-Dec	Potatoes	343	2	0.6	0.20 M
CHLORPROPHAM			Total of positives = 60		
May-Dec	Potatoes	343	60	17.5	1.11 M
DCPA			Total of positives = 9		
Aug-Dec	Lettuce	258	9	3.5	21 B
pp'-DDD			Total of positives = 1		
May-Dec	Potatoes	343	1	0.3	3 B
pp'-DDE			Total of positives = 14		
Aug-Dec	Lettuce	258	3	1.2	20 B
May-Dec	Potatoes	343	11	3.2	13 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
pp'-DDT			Total of positives = 2		
Jun-Dec	Potatoes	331	2	0.6	19 B
DIAZINON			Total of positives = 3		
Sept-Dec	Apples	211	1	0.5	35 B
Nov-Dec	Lettuce	104	1	1.0	57 B
Jun-Dec	Potatoes	331	1	0.3	7 B
DIMETHOATE			Total of positives = 8		
Nov-Dec	Apples	104	7	6.7	0.12 M
Nov-Dec	Grapes	104	1	1.0	0.25 M
ENDOSULFAN I AND II			Total of positives = 23		
Nov-Dec	Apples	104	7	6.7	29 B
Aug-Dec	Grapes	259	8	3.1	36 B
Jun-Dec	Potatoes	331	3	0.9	13 B
Oct-Dec	Lettuce	156	5	3.2	60 B
ENDOSULFAN SULFATE			Total of positives = 29		
Nov-Dec	Apples	104	3	3.8	12 B
Aug-Dec	Grapes	259	4	1.5	29 B
Oct-Dec	Lettuce	156	5	3.2	64 B
Jun-Dec	Potatoes	331	16	4.8	22 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
ETHION			Total of positives = 6		
Nov-Dec	Apples	104	1	1.0	0.36 M
Sept-Dec	Grapefruit	206	1	0.5	12 B
Sept-Dec	Oranges	207	4	1.9	10 B
IMAZALIL			Total of positives = 59		
Aug-Dec	Grapefruit	257	22	8.6	0.15 M
Aug-Dec	Oranges	256	37	14.4	0.14 M
MALATHION			Total of positives = 3		
Nov-Dec	Oranges	104	3	3.1	60 B
METHIDATHION			Total of positives = 2		
Aug-Dec	Oranges	256	2	0.8	12 B
METHYL PARATHION			Total of positives = 2		
Oct-Dec	Apples	156	2	1.2	97 B
MYCLOBUTANIL			Total of positives = 22		
Jul-Dec	Grapes	309	22	7.1	91 B
PCP- METHYLSULFIDE (c)			Total of positives = 1		
Sept-Dec	Potatoes	207	1	0.5	10 B
PENTACHLOROANILINE (c)			Total of positives = 1		
Sept-Dec	Potatoes	207	1	0.5	50 B
PENTACHLOROBENZENE			Total of positives = 1		
Sept-Dec	Potatoes (v)	207	1	0.5	30 B

APPENDIX B (continued)

MONTHS	COMMODITIES	SUMMARY OF RESULTS			
		NUMBER OF SAMPLES	POSITIVE SAMPLES (a)		
			Number	Percent	Mean (b)
PHOSMET			Total of positives = 6		
Sept-Dec	Apples	211	5	2.4	0.18 M
Nov-Dec	Grapes	104	1	1.0	39 B
THIABENDAZOLE (d)			Total of positives = 46		
Aug-Dec	Grapefruit	35	21	60.0	76 B
Aug-Dec	Oranges	35	25	71.4	0.22 M
VINCLOZOLIN			Total of positives = 5		
May-Dec	Grapes	342	5	1.5	0.12 M

TOTAL PESTICIDES FOUND = 547
TOTAL SAMPLES ANALYZED = 1963

* Pesticide/commodity pairs of interest to EPA.
(a) Samples for which pesticide residues were detected.
(b) The mean value of the concentrations reported. It does not include samples where these pesticides were not detected.
(c) PCNB metabolites.
(d) Thiabendazole determinations only apply to Michigan samples.
(v) Violation: residues found where tolerance was not established.
B Parts per billion.
M Parts per million.

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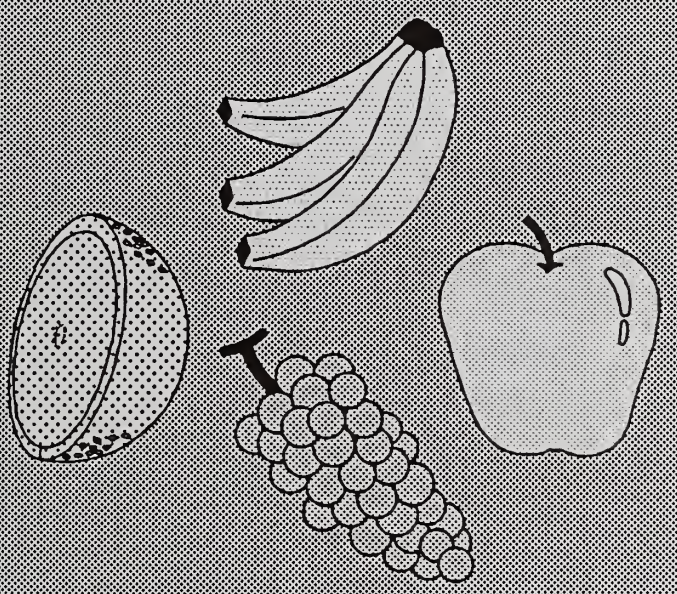
Pesticide Data Program

January - June, 1992 Report



21 SEP 1993

Agricultural Marketing Service

U.S. Department of Agriculture

9338

United States Department of Agriculture
Agricultural Marketing Service
P.O. Box 96456
Washington, DC
20090-6456

July 1993

To the Reader:

In May 1991, the Agricultural Marketing Service of the United States Department of Agriculture implemented the Pesticide Data Program (PDP) to collect objective, comprehensive data on pesticide residues for fresh fruits and vegetables. This program was submitted to Congress as part of the President's 1991 budget to address the increased interest in food safety by producers and consumers.

This program was designed to provide government agencies with an improved data base to respond more effectively to food safety issues. The primary recipient of the program's data will be the Environmental Protection Agency, which will use this information to support its risk assessment process.

The enclosed report provides residue data for the first six months of calendar year 1992. PDP has been funded by Congress and is operated through Cooperative Agreements with participating States, which have the responsibility for sample collection and analysis. Through the end of 1992, there were six participating States as follows: California, Florida, Michigan, New York, Texas, and Washington.

The program was expanded during the last six months of 1992 to include additional commodities and pesticide classes. This information will be reflected in the full PDP Calendar Year 1992 Report, which will be published in the fall of 1993. Program operations were expanded once again in January of 1993 to include three new participating States. The addition of these States--Colorado, North Carolina, and Ohio--increased the segment of the Nation's population represented by PDP sampling to approximately 50 percent, and also provided for a greater degree of regional diversity.

We welcome comments regarding this report. Comments should be addressed to:

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The Agricultural Marketing Service
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United States Department of Agriculture

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EXECUTIVE SUMMARY

Background

In May, 1991, the U.S. Department of Agriculture implemented the Pesticide Data Program (PDP) to collect objective, comprehensive data on pesticide residues in fresh fruits and vegetables. By having access to pesticide residues which are measured as close to the consumer level as possible, the Environmental Protection Agency can more accurately determine exposure, and thus better estimate dietary risk to the consumer. PDP is a multi-agency program with planning, policy, and procedural efforts coordinated among the U.S. Department of Agriculture (USDA), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). All data produced by PDP will be available for use by EPA to conduct dietary risk assessments, address pesticide reregistration issues, and complete the special review of specific pesticides. Figure A gives an overview of program management and operations.

To expedite program implementation, AMS established Cooperative Agreements with agencies in six States (California, Florida, Michigan, New York, Texas, and Washington) to collect and analyze PDP samples. These States were selected because they represent diverse geographic areas of the country, approximately 40 percent of the Nation's population, and a large percentage of the fresh fruits and vegetables grown in the United States. Commodities chosen for inclusion in the program were among those most prevalently consumed by the American public, and pesticides targeted for data collection were selected by EPA in consultation with USDA. Participating States were assigned a specific number of samples to collect per month based on each State's population. Samples were collected at sites such as terminal markets and large distribution centers, which allows for sampling as close to the consumer level as possible. Sampling at these locations also provides grower and packer information, post-harvest pesticide use, and takes into account pesticide degradation that has occurred during transit and storage.

1992 Program Operations, January-June

The January-June 1992 Report presents the data for the first six months of 1992. The number of commodities included in the program remained at 7 in January, but was increased in February to include celery, green beans, and peaches, for a total of 10 commodities. The participating States remained at six, with a total of eight testing facilities. A USDA regional laboratory, needed to perform special analysis, became PDP's ninth testing facility in May.

Each State provided AMS with a quarterly sampling plan following PDP sampling guidelines, which required that sampling dates and sites be selected at random. Uniformity of sampling technique and strict adherence to the guidelines were emphasized. Participating laboratories were required to meet rigorous quality assurance/quality control (QA/QC) criteria. To facilitate this goal, PDP provided similar instrumentation for each laboratory and provided training on instrument use that was tailored to program needs.

During the first six months of 1992, some 2,859 samples were collected and analyzed. Individual allocation of samples by State was as follows: California (769), Florida (435), Michigan (386), New York (507), Texas (487), and Washington (275). These produce samples originated from six participating States, 25 other States, and 13 foreign countries. Of the 2,859 samples, 1,664 (58%) contained detectable levels of 1 or more pesticides.

The data collection requirements and advanced analytical technology utilized by PDP have resulted in a significant number of residue detections in some commodities. For example, in apples, celery, grapes, and peaches, approximately 80 percent of the samples tested contained detectable residues, and in some cases more than one residue was detected in an individual sample. However, as many as 47.2 percent of all residues detected were below 0.10 parts per million, with 7.6 percent of the detections below 10 parts per billion.

In general, the levels of pesticide residues detected were substantially below tolerances. Violative residues were detected in 19 of the samples, 6 of which were in imported commodities. Of the 19 violations found, 5 exceeded the tolerance level and the other 14 had residues where no tolerance is established. Although PDP does not have enforcement authority, AMS and the States do notify FDA when violations are found. This data may assist FDA by pinpointing areas where closer surveillance may be required.

1992 Program Operations, July-December Preview

As of July 1, 1992, samples collected in all six participating States were being analyzed for 2,4-D and bromoxynil. On July 20-23, AMS hosted the fifth PDP Federal-State Meeting in conjunction with the Florida Pesticide Residue Workshop. The Sampling and Laboratory Standard Operating Procedures (SOPs) were discussed at the meeting, both of which were completed in December.

In August, AMS established Cooperative Agreements with Colorado, North Carolina, and Ohio for sample collection only. These three new States and AMS agreed that samples collected would be analyzed by one or more of the other participating laboratories. The addition of these States increased the segment of the Nation's population represented by PDP sampling to approximately 50 percent and also provided for a greater degree of regional diversity.

Broccoli and carrots were added to the program October 1, for a total of 12 commodities. On October 20-21, AMS hosted the 6th PDP Federal-State Meeting. Among topics discussed at the meeting were modifications to the PDP sampling protocol to alter the probability of site selection.

The PDP Calendar Year 1992 Report, summarizing pesticide residue data for all of 1992, will be published by the fall of 1993. This annual report will also provide more detailed information on distribution ranges of residue levels for selected pesticide/commodity pairs.

1993 Preview

In January 1993, PDP implemented a statistically defensible sampling plan whereby the probability of site selection is based on the amount of produce distributed by the site. This plan was developed with the statistical support of the USDA National Agricultural Statistics Service (NASS), which will provide long-term maintenance and support for the sampling system. Information obtained through PDP sampling provides data which can be used to make national inferences based on the States sampled. Sample collection and analysis for the three new States also began in January, as well as testing for at least five selected N-methyl carbamates.

Formetanate analysis for apples and peaches will begin in July 1993, whereas analysis for grapefruit and oranges will begin later in the year.

Testing procedures will be evaluated for additional pesticides such as avermectin, ethephon, oxadixyl, propargite, thiodicarb, and thiophanate methyl.

FIGURE A

OVERVIEW OF PDP MANAGEMENT AND OPERATIONS

Risk Assessment

- National Inferences
- Reregistration and Special Review of Pesticides by EPA

Interagency Coordination

- Memorandum of Understanding (USDA, EPA, FDA)
- Executive Steering Committee
- Long Range Planning
- Semi-Annual Plans

Federal and State Cooperation

- Cooperative Agreements with States:
  California, Colorado, Florida, Michigan, New York, North Carolina, Ohio, Texas, Washington
- Allocation of Funding

Sampling

- Statistically Defensible
  Proportional to Site Volume
  Proportional to State Population
- Near Consumer Level
- Standard Operating Procedures
- Retains Origin of Product

Laboratory Analysis

- Targeted Pesticide List
- Standard Operating Procedures
- Quality Assurance System
  EPA GLPs
  Proficiency Check Sample Program
- Residue Verification

Data Management

- Oracle Based System
- Electronic Transfer of Data
- Profile Search and Data Collation

SECTION 1.0 - INTRODUCTION

The U.S. Department of Agriculture (USDA) implemented the Pesticide Data Program (PDP) in May 1991, to collect objective, comprehensive data on pesticide residues in selected fresh fruits and vegetables. By having access to pesticide residues which are measured as close to the consumer level as possible, the Environmental Protection Agency (EPA) can more accurately determine exposure, and thus better estimate dietary risk to the consumer. PDP data will also be available for use by EPA to address pesticide reregistration needs, and complete the special review of specific pesticides.

The USDA's Agricultural Marketing Service (AMS) has been charged with implementation and management of PDP. The agency serves as liaison with the participating States, the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA) to evaluate data collection needs for pesticide residue information, develop program plans, and prioritize the inclusion of commodities and pesticides in PDP. Day-to-day operations are managed through frequent communication between AMS and the participating States and regional laboratories.

EPA consults with USDA to develop the list of pesticide/commodity pairs targeted for data collection by PDP. The EPA list is revised periodically to address changes in data needs. In addition to the pesticides requested by EPA, other compounds have been included in the program over time, based on their frequency of detection by PDP. Program operations are designed so these revisions in the testing profile can be easily implemented. Figure 1.0 shows all pesticides currently being tested in PDP.

PDP's data recording and coding system for pesticide residues and commodities follows FDA's coding system, which enhances uniform data reporting among government agencies. In addition, information collected by the program may assist FDA by providing information on the use of post-harvest fungicides, and by pinpointing areas where closer surveillance may be required as a follow-up to apparent violations identified by PDP.

1.1 1992 Program Operations, January-June

The six participating States (California, Florida, Michigan, New York, Texas, and Washington) were selected because they represent diverse geographic areas of the country, approximately 40 percent of the Nation's population, and a large percentage of the fresh fruits and vegetables grown in the United States. Three of the States also distribute a significant amount of produce to other States. For example, 50 percent of Hawaii's and 75 percent of Nevada's produce comes from California, and 95 percent of Alaska's produce comes from Washington. New York supplies 60 percent of New Jersey's produce, as well as 25 percent of the produce distributed to three of the New England States (Connecticut, Massachusetts, and Vermont). Although these seven States are not PDP participating States, PDP data will apply to a significant portion of their population. Ten to 20 percent of the produce distributed to Arizona, Connecticut, Massachusetts, New Mexico, Oklahoma, Oregon, Vermont, and Wyoming is routed through one or more of the PDP participating

States. Figure 1.1 shows the geographic location of the participating States and other States to which there is a major distribution of produce.

The six participating States were assigned a number of samples to collect per commodity each month based on the State's population. The following table indicates the number of samples assigned per State and the annual totals for each commodity sampled.

Sample Assignments By State

State	# of Samples Per Commodity Each Month	Annual Total Per Commodity
California	14	168
Florida	8	96
Michigan	7	84
New York	9	108
Texas	9	108
Washington	5	60
TOTALS	**52**	**624**

Commodities chosen for inclusion in the program were among those most prevalently consumed by the American public.

The January-June 1992 report presents PDP data for the first six months of 1992. The number of commodities included in the program remained at seven in January, but was increased in February to include celery, green beans, and peaches, for a total of 10 commodities. The number of EPA targeted pesticides in the program increased from 11 to 13 in March, and, in April, New York began testing for 2,4-D and bromoxynil. In May, PDP enlisted the services of USDA's Animal and Plant Health Inspection Service (APHIS) laboratory to begin testing for benomyl in three commodities (apples, bananas, and green beans), bringing the number of EPA-targeted pesticides to a total of 16, and the number of testing facilities to a total of 9. In addition, 34 other compounds were detected by PDP during the first half of 1992, 13 of which were from the updated November 1992 EPA list.

A total of 2,859 samples were collected and analyzed during the first six months of 1992, 1,664 (58 percent) of which had detectable residues. A total of 42 different pesticides were found. Many samples contained multiple residues, ranging from two to eight detected per sample.

1.2 1992 Program Operations, July-December Preview

In July, the APHIS laboratory began 2,4-D and bromoxynil analysis on samples from Florida, Michigan, Texas, and Washington--while California began testing its own samples. By July, samples collected in all six States were being analyzed for 2,4-D and bromoxynil (New York began analyzing for these compounds in April).

July 20-23, AMS hosted the fifth PDP Federal-State Meeting in conjunction with the Florida Pesticide Residue Workshop. Discussed at the meeting were the Sampling and Laboratory Standard Operating Procedures (SOPs), both of which were published in December as part of the AMS Semi-Annual Program Plan for January-June 1993.

In August, AMS established Cooperative Agreements with Colorado, North Carolina, and Ohio for sample collection only. Under these agreements, samples collected by the new States will be analyzed by one or more of the other participating laboratories. With the addition of these States, the segment of the Nation's population represented by PDP sampling was increased to approximately 50 percent.

Adding these States also provided for a greater degree of regional diversity. The monthly sample assignment per commodity for the new States was: Colorado-two, North Carolina-four, and Ohio-six.

Broccoli and carrots were added to the program in October, bringing the total number of commodities to 12.

October 20-21, AMS hosted the sixth PDP Federal-State Meeting. Discussed at the meeting were modifications to the PDP sampling protocol. Site volume information needed for these modifications was gathered throughout the remainder of 1992, and a site weighting system was completed.

The PDP Calendar Year 1992 Report, summarizing pesticide residue data for all of 1992, will be published by the fall of 1993. This annual report will also provide more detailed information on the distribution of residue levels for selected pesticide/commodity pairs.

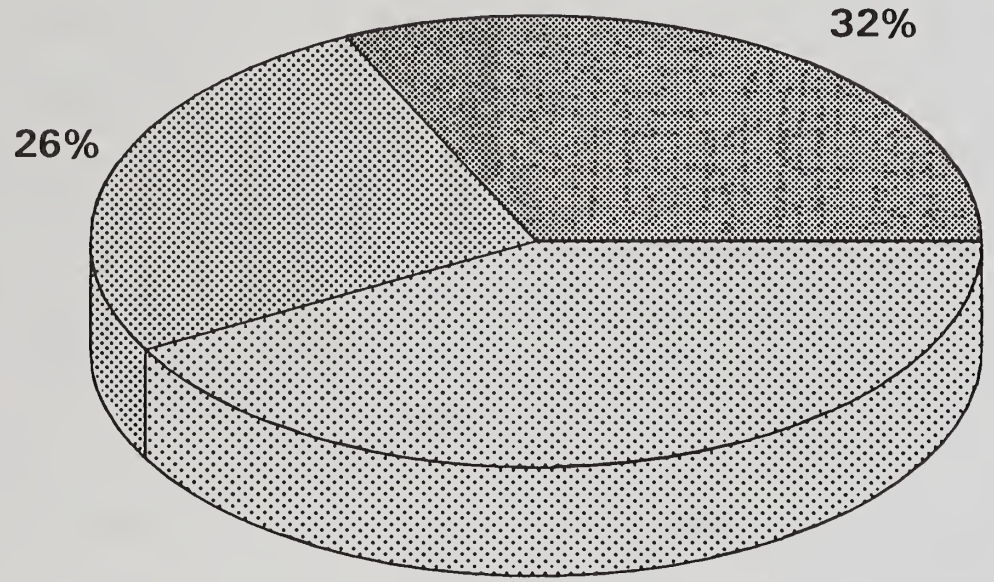
1993 Preview

In January 1993, PDP implemented a statistically defensible sampling plan whereby the probability of site selection is based on the amount of produce distributed by the site. This plan was developed with the statistical support of the USDA National Agricultural Statistics Service (NASS), which will provide long-term maintenance for the sampling system. Information obtained through PDP sampling provides data which can be used to make national inferences based on the States sampled. Sample collection and analysis for the three new States also began in January, as well as testing for at least five selected N-methyl carbamates.

Formetanate analysis for apples and peaches will begin in July 1993, whereas analysis for grapefruit and oranges will begin later in the year.

Testing procedures will be evaluated for additional pesticides such as avermectin, ethephon, oxadixyl, propargite, thiodicarb, and thiophanate methyl.

Figure 1.0
Pesticides in PDP



Original EPA List (16)

2,4-D; Acephate; Atrazine*; Benomyl; Bromoxynil*; Chlorpyrifos; Dicloran; Dicofol; HCB*; Iprodione; Lindane*; Methamidophos; Methoxychlor; Permethrins; PCB*; PCNB;

Additional EPA List (13)

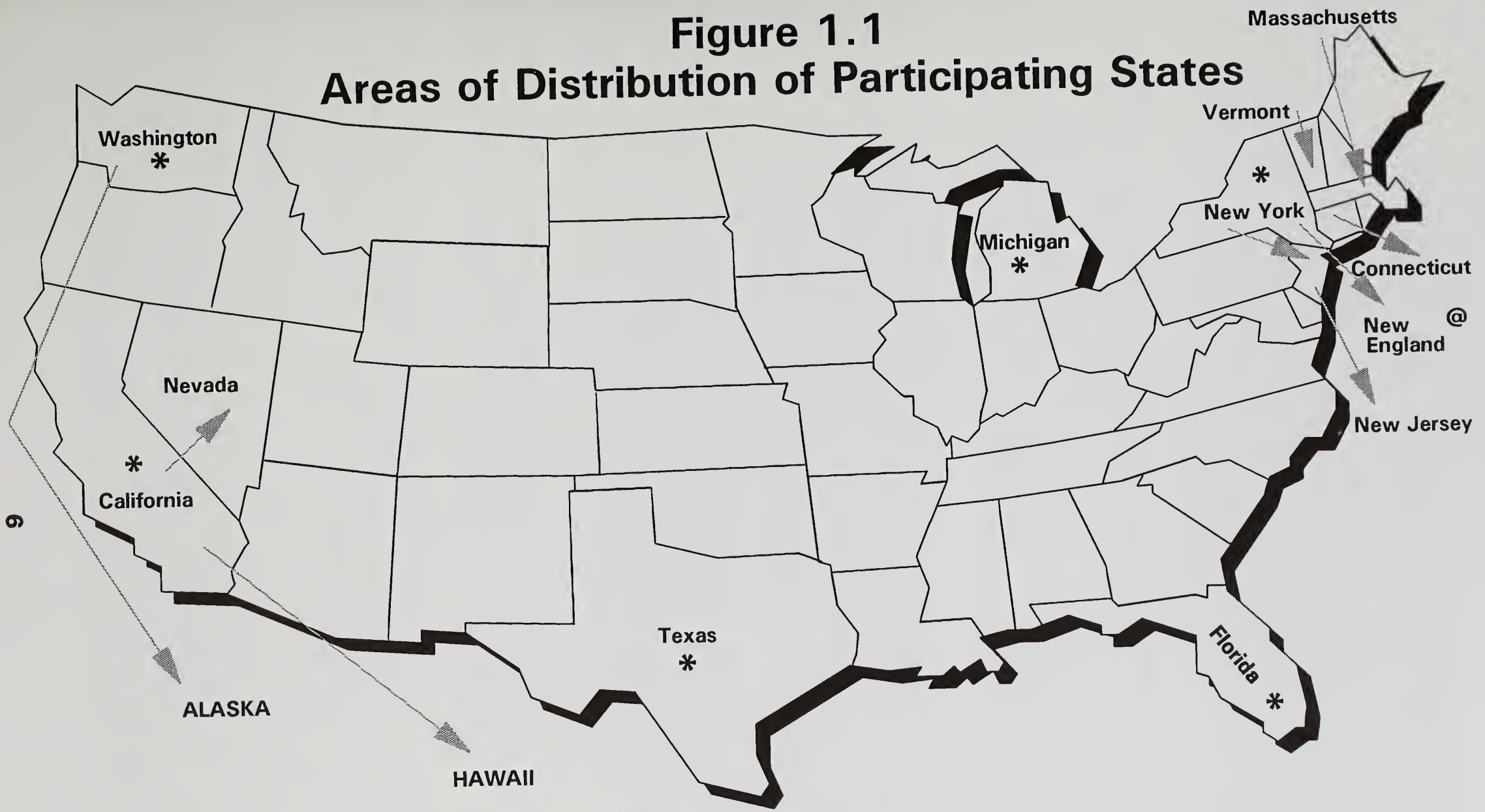
Azinphos-methyl; Chlorothalonil; Diazinon; Dichlorvos; Disulfoton; Endosulfan; Ethion; Fenamiphos*; Malathion*; Parathion-methyl; Methidathion; Mevinphos; Oxydemeton-methyl*

Other (21)

Anilazine; Captan; Carbaryl; Chlorpropham; Cypermethrin; Dacthal; DDE; DDT; Dimethoate; Diphenylamine; Ethoprop; Imazalil; Myclobutanil; Omethoate; Parathion; Phorate Sulfone; Phosalone; Phosmet; Propargite; Thiabendazole; Vinclozolin

* not detected

Figure 1.1
Areas of Distribution of Participating States



*

Six Participating States
California
Florida
Michigan
New York
Texas
Washington

DISTRIBUTED FROM	MARKETED IN
California	Hawaii,50% Nevada,75% New Jersey,60%
New York	New England,25% @ (Vermont, Connecticut, & Massachusetts)
Washington	Alaska,95%

SECTION 2.0 - SAMPLING OVERVIEW

PDP data will be used to make national inferences for dietary risk assessment. For this reason, PDP's sampling protocol is designed to be objective, random, and statistically defensible. From the onset of PDP in 1991, the protocol met the first two criteria. This was accomplished by: (1) the number of samples collected each month being proportional to State population, (2) requiring that sampling dates and sites be selected at random, and (3) no predetermination being made regarding product variety or origin.

In the spring of 1992, AMS began researching methods to enhance the sampling protocol to make it more statistically defensible. To help accomplish this objective, AMS enlisted the services of USDA's National Agricultural Statistics Service (NASS). NASS introduced a "site weighting" concept by which the probability of a site being selected is proportional to the volume of produce it distributes. Research continued throughout the remainder of 1992 to finalize development and implementation of the site weighting system.

PDP samples were collected by the six participating States at sites such as terminal markets and large distribution centers. The volume of produce distributed by these sites varies depending on their geographic location and the area they serve. In the larger States, such as Texas, as many as 161,500 tons of produce may be distributed by one site in a given year. The States were responsible for researching and compiling a list of appropriate sampling sites, which varied in number from 18 in Washington to 284 in California.

Sample collection at these locations provided for obtaining produce as close to the consumer as possible, where information on the grower and packer is still available. Data collected closer to the time of consumption presents a more accurate picture of residues than data collected at the farm gate. It also takes into account pesticide degradation that occurs during transit and storage, as well as the application of post-harvest fungicides.

As discussed in the Introduction (Section 1.0), the participating States were assigned a number of samples to collect per commodity each month. This number ranged from 5 in Washington to 14 in California, and was based on State population.

Representatives of each participating State were trained in the PDP sampling procedures, and were responsible for training the sample collectors in their respective States. Uniformity of sampling technique and strict adherence to the PDP sampling procedures were emphasized.

2.1 Sampling Procedures

The Science Division of AMS provided a quarterly program plan specifying the commodities to be collected. In turn, each State was required to submit to AMS a quarterly sampling plan designating the date(s) of collection and sampling sites per commodity. Both the dates and sites were chosen at random; however, a commodity could not be sampled twice from the same site in a given month. The States were asked to collect all samples for one commodity

on the same date, or within two consecutive dates, and to ensure that samples would arrive at the testing facility within 24 hours of collection.

Sample collectors were provided with uniform sampling procedures to follow at the collection sites. Samples were selected at random, with no predetermination made regarding product variety or origin. A sample information form was filled out for each sample collected, which included the State abbreviation, date, site number, and commodity code. The information provided by these four items was combined to generate a unique identification number for that sample. Information requested on the form also included: (1) whether the sample was domestic or imported; (2) if imported, country of origin; (3) name of sampling site, grower, and packer; and (4) a listing of potential or known post-harvest fungicides.

States were requested to utilize alternative sampling sites in the event that a commodity was not available at the original sampling site. This would better enable the States to fulfill the objectives of the program plan (i.e., number of samples to collect per commodity). The alternate sites were also chosen at random, but a certain amount of flexibility was provided for logistical purposes.

2.2 Statistics on Samples Collected

A total of 2,859 samples of fresh produce were collected January-June 1992. States were instructed to collect at least a 5-pound sample for each applicable testing facility. Individual allocation of samples by State is as follows: California (769), Florida (435), Michigan (386), New York (507), Texas (487), and Washington (275).

Appendix 1 provides a calendar for each of the six months, January-June. Each date selected for sampling contains the State abbreviation, the commodity, and the number of samples collected. The individual commodity and monthly totals are, in some cases, less than the assigned number of samples due to the unavailability of product at either the original or the alternative sampling site. At the bottom of each calendar is the total number of samples collected, and the number of commodities in the program during that month. The information in this appendix is listed alphabetically by the two-letter commodity code abbreviation. Likewise, the commodity information provided in the other appendices is alphabetized in the same manner. The commodity codes utilized by PDP are: apples-AP, bananas-BN, broccoli-BR, celery-CE, carrots-CR, green beans-GB, grapefruit-GF, grapes-GR, lettuce-LT, oranges-OG, peaches-PC, and potatoes-PO.

Appendix 2 lists the geographic regions in each State, the number and percent of sampling sites in each region, and the number and percent of samples collected in each region. The totals following each State, and at the end of the table, are for the entire January-June sampling period. As shown, the total number of sites varies from 18 in Washington to 284 in California, and the total number of samples collected varies from 275 in Washington to 769 in California.

Samples collected by PDP in the first six months of 1992 originated from the six participating States, 25 other States, and 13 foreign countries. Sample collection was based on general commodity type, regardless of the variety or place of origin. Appendix 3 shows the origin of each sample collected, by commodity. Other information shown in the appendix is: 1) 62 percent of the apples were from Washington; (2) 100 percent of the bananas were imported; (3) the majority of celery, green beans, grapefruit, and oranges originated from either California or Florida; (4) 81 percent of the grapes were imported; (5) all lettuce samples were domestic, with 87 percent grown in California; (5) 87 percent of the domestically grown peaches came from California and Georgia, and 90 percent of the imported peaches came from Chile; and (6) potato samples originated from a wide variety of States. Figure 2.0 shows the percentage of imported versus domestic samples per commodity. Figure 2.1 gives the geographic origin of domestic samples.

Appendix 4 gives the number of samples collected each month by commodity, and the breakdown of number and percentage of imported versus domestic. As Appendix 4 indicates, 717 (25 percent) of the samples were imported, and 2,142 (75 percent) were domestic. Celery, green beans, and peaches were not included in the program until February; therefore, their sample totals are lower. Additionally, due to seasonal variations, a number of peach samples were not available during March, April, and May.

Figure 2.0
Commodity Distribution Percentages
Imported vs. Domestic

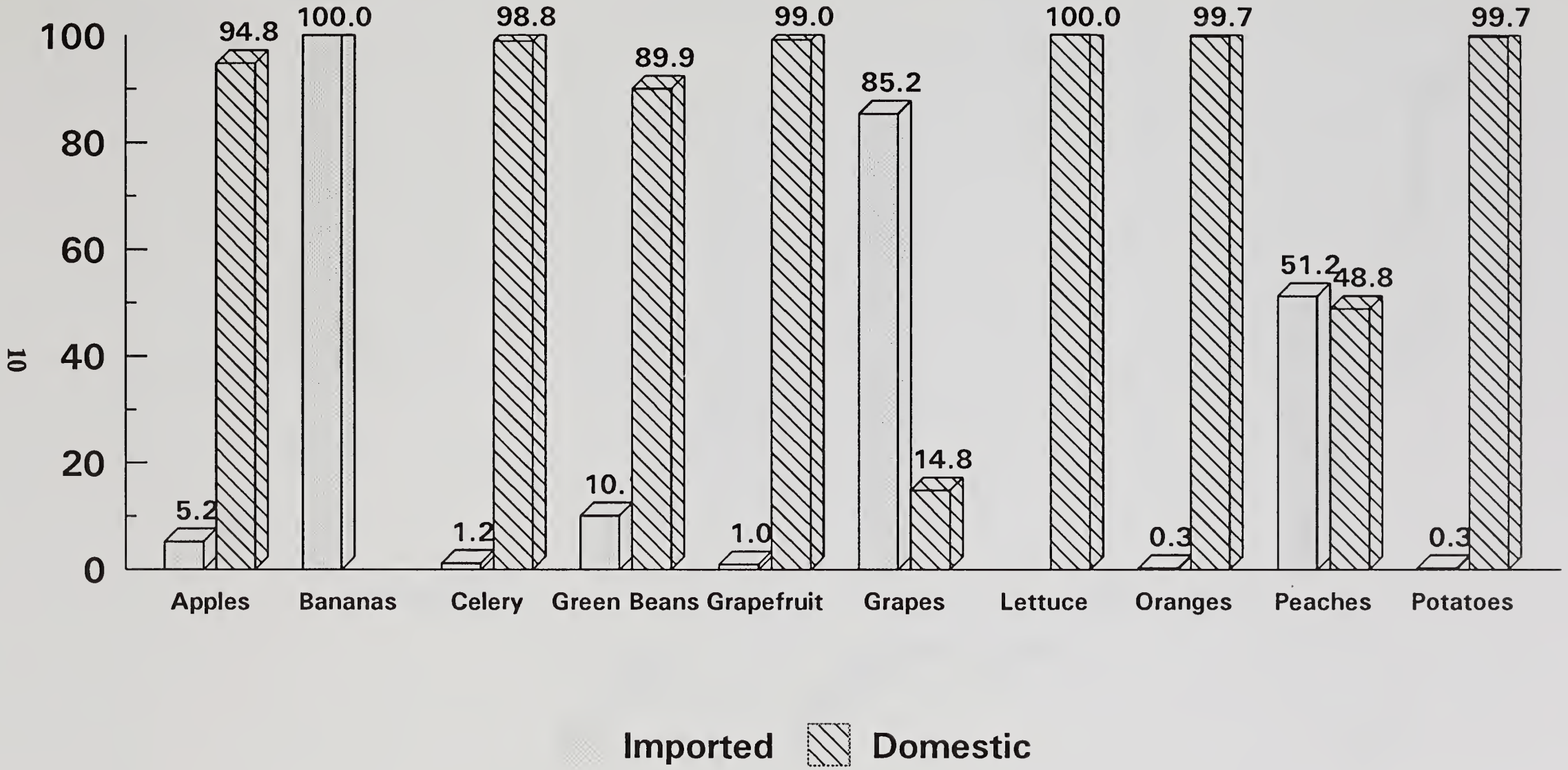
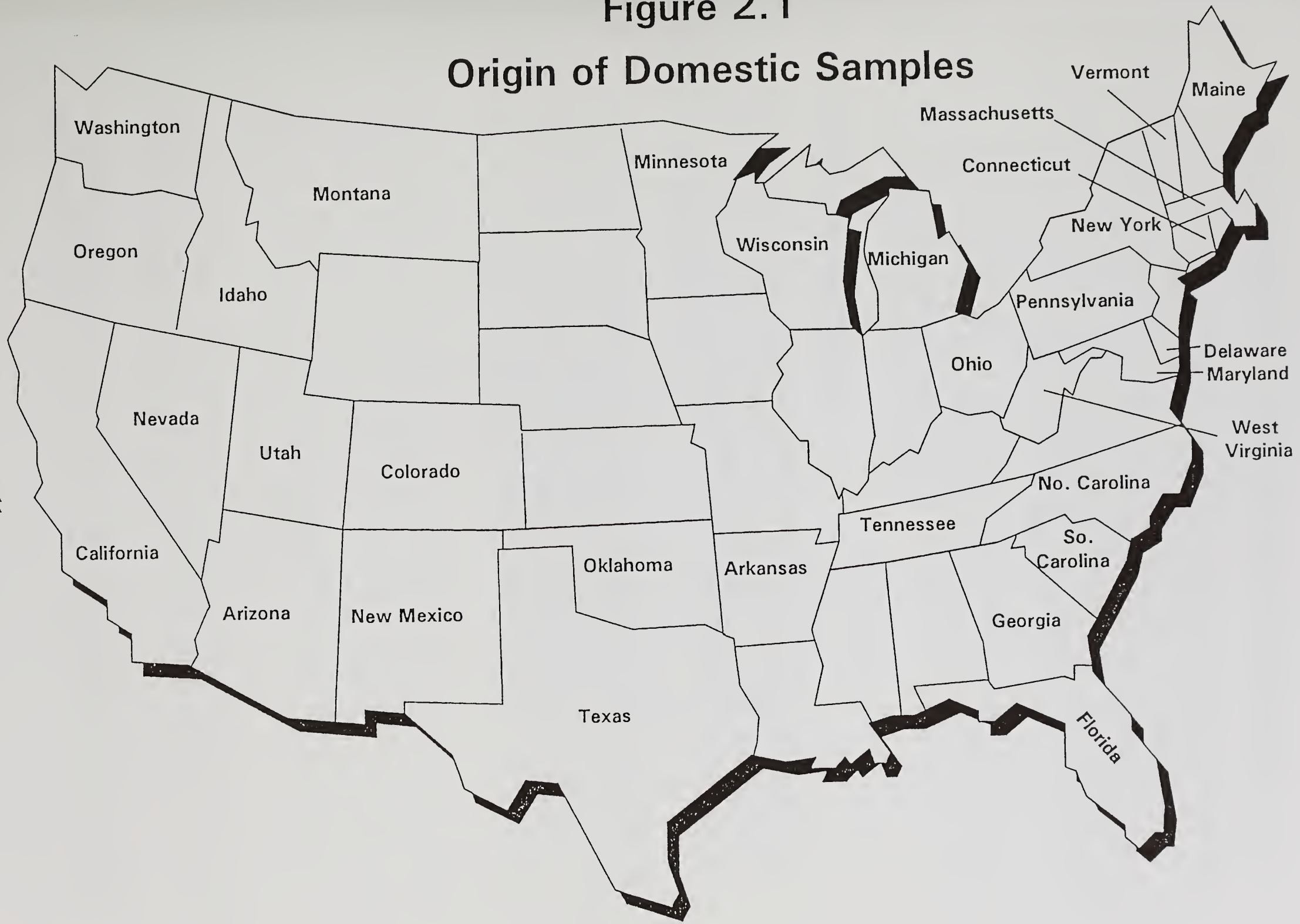


Figure 2.1

Origin of Domestic Samples



SECTION 3.0 - LABORATORY OVERVIEW

In the first half of 1992, PDP participating laboratories performed analyses for chlorinated, organophosphorus, and organonitrogen pesticides in 2,859 samples. The number of EPA-targeted pesticides in the program increased from 11 in January to 13 in March; and, in April, New York began testing for 2,4-D and bromoxynil. Benomyl testing was added in May, bringing the number of EPA-targeted pesticides to a total of 16. In addition, 34 other compounds are tested by PDP, 13 of which were added to the EPA list as of January 1993. These pesticides and their tolerances are listed in Appendices 5 and 6.

For the determination of benomyl, which requires a single residue method, PDP enlisted the services of USDA's Animal and Plant Health Inspection Service (APHIS) laboratory to analyze three commodities (apples, bananas, and green beans). With the addition of APHIS, the number of testing facilities increased to nine.

3.1 Quality Assurance Program

To achieve data equivalency among participating laboratories, PDP required adherence to rigorous quality assurance/quality control (QA/QC) criteria. To facilitate this goal, PDP purchased similar equipment for all participating laboratories and provided training on instrument use, which was tailored to program needs. PDP's quality assurance program encompasses five elements:

- Proficiency Check Samples - All facilities were required to participate in the PDP Check Sample Program. Each quarter, three to four commodities, containing several pesticides with known quantities, were sent to the participating laboratories and tested under the same conditions as routine samples. The resulting data were used to determine performance equivalency among the testing laboratories, and to evaluate individual laboratory performance.

- Quality Control - Since quality control requirements are the same for one sample as for several samples, it is more economical and efficient to collect and process the samples as a set. Thus, laboratories were permitted to refrigerate incoming samples of the same commodity for up to 72 hours, to allow for different sample arrival times from the collection sites. PDP quality control guidelines require that samples be tested as part of an analytical set, which includes the sample set and the following components:

  1. **Reagent Blank:** An amount of distilled water, equivalent to the natural moisture content of the commodity, is run through the entire analytical process to determine glassware cleanliness and system integrity.

  2. **Matrix Blank:** A previously analyzed sample of the same commodity, which contains either very low concentrations of known residues or no detectable residues,

is divided into two portions. The first portion is used to give background information on naturally occurring chemicals, and the second one is used to prepare a matrix spike.

3. **Matrix Spike(s):** A portion(s) of matrix blank is spiked with all pesticides of interest to PDP prior to extraction. The matrix spike is used to determine the accuracy of the analyst and instrument performance.

4. **Process Control Spike:** A compound of physical and chemical characteristics similar to those of the pesticides being tested is used to evaluate the analytical process on a sample-by-sample basis. Each of the analytical set components, except for the reagent and matrix blanks, is spiked with process controls.

5. **Storage Spikes:** If a sample set is going to be frozen as a homogenate for more than 72 hours prior to analysis, analysts are required to prepare storage spikes in order to demonstrate the validity of the set. Storage spikes are prepared in the same manner as matrix spikes, but do not remove the requirement to run a fresh matrix spike at the time of analysis.

- Method Performance and Confirmation - Laboratories are required to determine the limits of detection (LOD) and limits of quantitation (LOQ) for each commodity/pesticide pair. Confirmation by mass spectrometry, or a suitable alternate detection system, is required for all initial findings. If a finding is violative, the sample is reanalyzed in duplicate from the frozen homogenate, along with the appropriate blanks and a spike of the violative residue at the suspected level.

- Standard Operating Procedures (SOPs) - Standard Operating Procedures were developed to provide uniform administrative, sampling, and laboratory procedures. After submission, all data generated by the laboratories are reviewed for completeness and adherence to PDP requirements.

- On-Site Reviews - On-site reviews were performed to determine compliance with SOPs. Improvements in laboratory procedures were made as a result of the on-site reviews.

3.2 Sample Preparation

Samples were shipped directly to the laboratory performing the analyses where, upon arrival, they were visually examined for acceptability. Any sample received in poor condition (extensive bruising, off odor, decay, fungal growth, etc.) was discarded. Accepted samples were prepared emulating the practices of the average consumer, to more closely represent actual exposure to residues. For example, produce such as bananas, oranges, and grapefruit was peeled; for lettuce and celery, wilted leaves, debris, and other inedible portions were removed. Next, samples were rinsed under cold tap water to remove soil and grit.

Each sample was homogenized using choppers or blenders, then separated into analytical portions (aliquots) for analysis. In the event that testing could not be performed immediately, the entire sample set, plus all quality control samples, were frozen following PDP's QA/QC requirements. Thus, a set was required to be spiked with the process control spike and all applicable pesticide standards prior to being frozen at -40 °C or lower. At the time of analysis, the spikes provided information on whether degradation had occurred while the sample was frozen, therefore helping to determine the acceptability of the data. Aliquots, which could be needed for replication of analyses or for verification testing, were also retained frozen.

3.3 Sample Analysis

Methods of analysis used by Florida, Michigan, New York, and Texas were variations of the Luke extraction procedures developed by FDA. California and Washington used the multiresidue method developed by the California Department of Food and Agriculture (CDFA). Sample extractions and cleanup preparations were based on organic solvent/partition procedures to isolate pesticide chemicals.

Initial identification and quantitation of pesticides were achieved through various types of chromatography. Confirmation was accomplished by mass spectrometry (identifies the structures of compounds) or by alternate detection systems when applicable. Confirmation is necessary because of the complexity of commodity matrices and the extremely low concentration levels of detected residues. Thus, the confirmatory analysis provided an extra measure of confidence in both the identification of the pesticide residue and its concentration.

Limits of detection (LODs) and limits of quantitation (LOQs) for testing laboratories for each of the EPA-targeted pesticides are shown in Appendix 7. LODs and LOQs for other pesticides in PDP are shown in Appendix 8.

SECTION 4.0 - SAMPLE RESULTS

All commodities were screened for organochlorine, organophosphate, and organonitrogen compounds. These three pesticide screening processes allow for the detection of approximately 150 compounds. The data collection requirements and advanced analytical technology utilized by PDP have resulted in a significant number of residue detections in some commodities. For example, in apples, celery, grapes, and peaches, approximately 80 percent of the samples tested contained detectable residues; and, in some cases, more than one residue was detected in an individual sample. However, as many as 47.2 percent of all residues detected were below 0.10 ppm, with 7.6 percent of the detections below 10 ppb (see Table 1, Distribution of Pesticide Residue Concentrations by Commodity).

In general, the levels of pesticide residues detected were substantially below tolerances. Table 2 compares mean quantifiable concentrations of pesticide residues, detected in at least 10 percent of the samples, to established tolerances. Of the 36 pesticide/commodity pairs in Table 2, only four pairs resulted in a mean concentration which exceeded 10 percent of the tolerance: chlorpyrifos/peaches (30.0 percent), thiabendazole/bananas (26.8 percent), acephate/green beans (24.7 percent), and dimethoate/grapes (15.4 percent). Six pairs (captan/apples, captan/grapes, captan/peaches, endosulfan/apples, iprodione/grapes, and phosmet/peaches) had mean concentrations below 1 percent of established tolerances.

The following gives a brief overview of the sample results:

APPLES: Out of the 309 samples collected and analyzed, 239 or 77.3 percent of the samples had a minimum of 1 pesticide residue detected. Twenty different pesticides were detected, with thiabendazole as the most frequently found. Other pesticides with high incidence levels are diphenylamine, azinphos-methyl, benomyl, chlorpyrifos, and endosulfans. The total number of pesticide residues detected, including multi-residue findings in a single sample, was 517. Three domestic violations were found for chlorothalonil, chlorpropham, and vinclozolin, for which no tolerance has been set by EPA.

BANANAS: Out of the 311 samples collected and analyzed, 69 or 22.2 percent of the samples were found to contain pesticide residues. Three different pesticides were detected, two of which have post-harvest fungicide uses. The most frequently detected pesticide was thiabendazole, which was found in 66 samples. The total number of pesticide residue occurrences in all samples was 72. One imported banana sample contained thiabendazole residues which exceeded the EPA tolerance level.

CELERY: Out of the 259 samples collected and analyzed, 205 or 79.2 percent of the samples had detectable pesticide residues. The pesticides most frequently found were permethrins, chlorothalonil, methamidophos, dicloran, and acephate. The total number of pesticide residue occurrences in all samples was 398. Five domestic

samples contained pesticide residues having no established tolerance level set by EPA. Three of these five samples contained DCPA (Dacthal) residues, and the other two contained iprodione.

GREEN BEANS: Out of the 238 samples collected and analyzed, 157 or 66 percent of the samples contained pesticide residues. The four most frequently found pesticides were endosulfans, methamidophos, chlorothalonil, and acephate. One domestic sample containing acephate and methamidophos had levels which exceeded the combined EPA tolerance. Two samples containing methamidophos (one domestic and one imported) and one imported sample containing permethrins had residues where no tolerance was established by EPA. The total number of pesticide residue occurrences for all green bean samples was 321.

GRAPEFRUIT: Out of the 310 samples collected and analyzed, 109 or 35.2 percent of the samples contained pesticide residues, with thiabendazole and imazalil as the most frequently found. Out of the 137 total pesticide residue occurrences, 5 different pesticides were found. No violations were found.

GRAPES: Out of the 297 samples collected and analyzed, 235 or 79.1 percent of the samples were found to contain pesticide residues. The four most frequently found pesticides were captan, vinclozolin, iprodione, and dimethoate. Three imported samples were found to contain pesticide residues exceeding the established tolerance levels. The three pesticide residues found in violation were chlorpyrifos, dimethoate, and parathion. Out of the 510 total pesticide residue occurrences, 16 different pesticides were found.

LETTUCE: Out of the 310 samples collected and analyzed, 105 or 33.9 percent of the samples were found to contain pesticide residues. The two most recurrent pesticides were endosulfans and permethrins. Sixteen different pesticides were found out of the 151 total pesticide residue occurrences. Two domestic samples contained chlorothalonil and chlorpyrifos residues, for which there are no established tolerances.

ORANGES: Out of the 311 samples collected and analyzed, 145 or 46.6 percent of the samples were found to contain pesticide residues. The two most frequently detected pesticides were thiabendazole and imazalil. There were 8 different pesticides detected from the 215 total pesticide residue occurrences. 2,4-D was detected by New York in two of the 27 samples tested.

PEACHES: Out of the 205 samples collected and analyzed for peaches, 169 or 82.4 percent of the samples contained pesticide residues. The five most frequently occurring pesticides were iprodione, captan, azinphos-methyl, clorpyrifos, and dicloran. One tolerance violation for dimethoate was found in one domestic sample. Out of the 344 total pesticide residue occurrences, 18 different pesticides were found. Propargite was detected by Florida in two of the 23 samples tested.

POTATOES: Out of the 309 samples collected and analyzed, 231 or 74.8 percent of the samples contained pesticide residues. Chlorpropham, the most frequently detected compound, was found in 68 percent of the 309 samples. Two other frequently occurring pesticides were DDE and thiabendazole. Out of the 304 total pesticide residue occurrences, 10 different pesticides were detected. No violations were found.

Appendix 9 gives a complete list of pesticides detected, by commodity. DDT and/or its metabolite DDE were found in celery, green beans, lettuce, peaches, and potatoes, although their presence is due to the environmental persistence of this chemical and not the result of new usage (use of DDT has been prohibited in the United States since 1973).

Appendix 10 gives the distribution of residue occurrences, by pesticide. The appendix is divided into three parts as follows: (A) pesticides from the original EPA list, (B) additional pesticides from the updated EPA list, and (C) other pesticides. Listed below each pesticide are the commodities in which the pesticide was detected, the States where the samples were collected, and the sample collection period. The Summary of Results section provides the total number of samples, and the number and percent of positives in those samples. Also given is the minimum detected value, or if the minimum detected value was below the quantifiable level (BQL), the range from BQL to the next quantifiable value is provided. The last column shows the maximum detected values reported. Concentrations are reported in either parts per million (M) or parts per billion (B). Concentrations lower than 0.10 M are expressed as 1-99 B. Higher concentrations are expressed in M.

4.1 Multiple Residues Detected

Different pesticides can be applied to a given crop in order to treat various pests that may affect the crop during a growing season. Having the capability to detect residues at concentrations much lower than tolerance levels has enabled PDP laboratories to confirm the presence of multiple residues in individual samples. These findings, which are presented in Appendix 11, show that, in one specific case, a sample contained the following eight pesticides: captan, endosulfans, omethoate, dimethoate, diphenylamine, thiabendazole, azinphos-methyl, and vinclozolin.

Appendix 11 is divided into four columns. Column A shows in descending order the number of residues that were detected in a single sample. Column B gives the number of samples found to contain the number of residues listed in Column A. Column C indicates the percentage of samples which contained the number of residues shown in Column A. Column D lists the three most frequently detected pesticides. In parentheses next to each pesticide is the number of positive findings for that pesticide. For example, row 2 under peaches shows that 14 samples contained 4 different residues each. Of the 205 total samples, 6.8 percent had 4 detectable residues per sample. The 3 most frequently detected pesticides were: iprodione with 12 positive findings, captan with 10 positive findings, and dicloran with 10 positive findings.

4.2 Non-Detected Residues

Of the 16 EPA targeted pesticides, atrazine, bromoxynil, HCB, lindane, and pentachlorobenzene (PCB) were not detected in any of the 2,859 samples. It should be noted, however, that atrazine and HCB have no registered uses for any of the PDP commodities. PCB is not a pesticide, per se, but is being monitored because it may be present as an impurity of the manufacturing process of some pesticides. PCB may also be present as a degradation product of HCB and quintozene. Bromoxynil and chlorothalonil testing were limited in scope with only one laboratory performing analysis in selected commodities.

4.3 Tolerance Violations

In order to take prompt corrective action, samples collected under enforcement programs have to be analyzed within hours of collection. PDP samples are not collected for enforcement purposes; therefore, quick sample turnaround is not essential. In fact, because of the complexity of the sample analysis requirements and the data review process, it may take 1 month or longer to complete a sample set. Furthermore, emphasis is placed on searching for residues at the lowest detectable levels for the pesticides of interest.

A violation occurs when a residue is found which exceeds tolerance levels set by EPA or when a residue is found for which there is no tolerance. Nineteen of the 2,859 samples contained violative residues, 6 of which were in imported commodities. As Appendix 12 indicates, 14 samples found in violation had residues where no tolerance was established by EPA for that pesticide/commodity pair. Under the Memorandum of Understanding signed by USDA, EPA, and FDA, the Pesticide Data Program is required to inform FDA of any violative residues found. This data may assist FDA by pinpointing areas where closer surveillance may be required.

TABLE 1. DISTRIBUTION OF PESTICIDE RESIDUE CONCENTRATIONS BY COMMODITY -- JANUARY-JUNE 1992

	COMMODITIES										Total
	Apples	Bananas	Celery	Green Beans	Grape-fruit	Grapes	Lettuce	Oranges	Peaches	Potatoes	
Total number of residues	517	72	398	321	137	510	151	215	344	304	2969
Number of residues ranging from 1 to 9 parts per billion	33	1	29	25	10	17	30	14	26	40	225
Percentage shown in parentheses	(6.4%)	(1.4%)	(7.3%)	(7.8%)	(7.3%)	(3.3%)	(19.9%)	(6.5%)	(7.5%)	(13.1%)	(7.6%)
Number of residues ranging from 10 to 99 parts per billion	197	49	204	119	66	201	83	81	120	56	1176
Percentage shown in parentheses	(38.1%)	(68.0%)	(51.2%)	(37.1%)	(48.2%)	(39.4%)	(55.0%)	(37.7%)	(34.9%)	(18.4%)	(39.6%)
Number of residues ranging from .10 to .99 parts per million	236	18	148	156	59	260	33	117	143	86	1256
Percentage shown in parentheses	(45.6%)	(25.0%)	(37.2%)	(48.6%)	(43.1)	(51.0%)	(21.8%)	(54.4%)	(41.6%)	(28.3%)	(42.3%)
Number of residues greater than 1.0 parts per million	45	0	11	19	1	30	3	2	46	116	273
Percentage shown in parentheses	(8.7%)	(0%)	(2.8%)	(5.9%)	(0.7%)	(5.9%)	(2.0%)	(0.9%)	(13.4%)	(38.2%)	(9.2%)
Number of residues Below the Quantifiable Level	6	4	6	2	1	2	2	1	9	6	39
Percentage shown in parentheses	(1.2%)	(5.6%)	(1.5%)	(0.6%)	(0.7%)	(0.4%)	(1.3%)	(0.5%)	(2.6%)	(2.0)	(1.3%)

TABLE 2 Quantifiable Concentration Detected vs. Established Tolerances

Pesticide	Tolerance (ppm)	Percentage of Samples with Detected Pesticide[1]	Mean of Residues Found[2] (ppm)	Percent of Tolerance
APPLES				
Azinphos-Methyl	2.0	22.7	0.10	5.0
Benomyl	7.0	10.5	0.23	3.3
Captan	25	9.7	0.16	0.64
Chlorpyrifos	1.5	14.2	0.056	3.8
Diphenylamine	10	35.0	0.74	7.3
Endosulfans	2.0	12.0	0.016	0.64
Thiabendazole	10	51.0	0.62	6.2
BANANAS				
Thiabendazole	7.0	26.0	0.10	27.5
CELERY				
Acephate	10	22.4	0.21	2.1
Chlorothalonil	15	35.5	0.57	3.8
Dicloran	15	11.3	0.30	2.0
Methamidophos	1	14.3	0.026	2.6
Permethrins	5.0	36.7	0.16	3.2
GREEN BEANS				
Acephate	3	28.2	0.74	24.7
Chlorothalonil	5	10.5	0.23	4.6
Endosulfans	2.0	35.0	0.16	7.5
Methamidophos	NT	32.8	0.20	4.6
GRAPEFRUIT				
Imazalil	10	11.3	0.18	1.8
Thiabendazole	10	10.5	0.18	1.8
GRAPES				
Captan	50	48.1	0.32	0.64
Dimethoate	1	13.5	0.15	15.0
Iprodione	60.0	39.7	0.29	0.48

TABLE 2 Quantifiable Concentration Detected vs. Established Tolerances

Pesticide	Tolerance (ppm)	Percentage of Samples with Detected Pesticide[1]	Mean of Residues Found[2] (ppm)	Percent of Tolerance
Vinclozolin	6.0	14.3	0.35	5.83
LETTUCE				
Endosulfans	2.0	14.8	0.037	1.9
Permethrins	20.0	9.8	0.36	1.8
ORANGES				
Imazalil	10	27.3	0.16	1.6
Thiabendazole	10	43.2	0.34	3.4
PEACHES				
Azinphos-Methyl	2.0	14.3	0.18	9.0
Captan	50	13.2	0.29	0.58
Chlorpyrifos	0.05	12.2	0.015	30.0
Dicloran	20	42.0	0.70	3.5
Iprodione	20.0	44.9	0.93	3.4
Phosmet	10	9.8	0.087	0.87
POTATOES				
Chlorpropham	50	68.0	1.6	3.2
DDE[AG]	1	11.7	0.010	1.0
Thiabendazole	10	10.2	0.37	3.7

AG Administrative Guidelines are not considered to be the same as Tolerances, but are sometimes used for pesticides for which there is not a registered use, but the pesticide is persistant in the environment.

NT Under 40CFR 180.315 there is no tolerance for methamidophos in green beans. However, 40CFR 180.108 specifies that for a <u>mixture</u> of acephate and its metabolite methamidophos there is a tolerance of 3 ppm of which <u>not more than</u> 1 ppm can be methamidophos, only if acephate is present.

1 These percentages are from Appendix 9. Only those pesticides detected in more than 10% (rounded) of the samples were included.

2 All detected pesticide residue concentrations that were below the Limit of Quantitation were <u>not</u> included in this calculation. The actual mean, when calculated, will require the inclusion of residue values below quantitative limits and estimates of all nondetected values. This will result in significantly lower mean concentrations.

APPENDIX 1

STATE SAMPLING COLLECTION DATES

JANUARY 1992

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		1	2	3
6 CA BANANA, 14 NY BANANA, 1 WA GRAPEFRUIT, 5 TX POTATOES, 9	7 FL BANANA, 8 NY BANANA, 8 MI LETTUCE, 7 CA POTATOES, 3	8 MI BANANA, 7 TX GRAPES, 8 WA LETTUCE, 5 CA POTATOES, 11	9 FL APPLES, 8	10
13 WA APPLES, 5 CA LETTUCE, 14 NY LETTUCE, 8 TX LETTUCE, 9	14 CA GRAPEFRUIT, 3 FL ORANGES, 8	15 CA GRAPEFRUIT, 11 NY GRAPEFRUIT, 7 WA GRAPES, 5 FL LETTUCE, 8 TX ORANGES, 9	16 NY GRAPEFRUIT, 2	17
20	21 NY APPLES, 8 WA BANANA, 5 TX GRAPEFRUIT, 9	22 CA APPLES, 14 NY APPLES, 1 TX APPLES, 9 MI GRAPEFRUIT, 7 NY ORANGES, 9 FL POTATOES, 8 WA POTATOES, 5	23 MI POTATOES, 6	24
27 TX BANANA, 9 NY GRAPES, 9 CA ORANGES, 14 WA ORANGES, 5	28 CA GRAPES, 4	29 MI APPLES, 6 CA GRAPES, 10 FL GRAPES, 7 MI ORANGES, 7 NY POTATOES, 9	30 MI APPLES, 1 FL GRAPEFRUIT, 8 FL GRAPES, 1 MI GRAPES, 7	31

TOTAL NUMBER OF SAMPLES: 361
TOTAL OF 7 COMMODITIES

APPENDIX 1

STATE SAMPLING COLLECTION DATES

FEBRUARY 1992

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
3 WA APPLES, 5 NY GRAPEFRUIT, 9	4 MI BANANA, 7 TX CELERY, 9	5 FL LETTUCE, 8 TX PEACHES, 7 WA POTATOES, 5	6 FL CELERY, 8 MI ORANGES, 7 TX PEACHES, 1	7
10 CA BANANA, 9 NY BANANA, 9 WA BANANA, 5 TX GREEN BEANS, 9 CA GRAPEFRUIT, 14	11 CA BANANA, 5 WA CELERY, 5 FL GREEN BEANS, 8 FL GRAPEFRUIT, 8 MI POTATOES, 7 TX POTATOES, 9	12 TX GRAPES, 9 WA ORANGES, 5	13 NY CELERY, 9 MI GREEN BEANS, 7 CA LETTUCE, 8 CA PEACHES, 11 FL POTATOES, 8	14 CA LETTUCE, 6
17	18 MI APPLES, 7 NY APPLES, 9 FL GRAPES, 8 TX LETTUCE, 9 WA LETTUCE, 5 CA PEACHES, 3 MI PEACHES, 6	19 FL APPLES, 8 CA CELERY, 12 WA GRAPES, 5 CA ORANGES, 14 TX ORANGES, 9 NY POTATOES, 9	20 CA CELERY, 2 NY GREEN BEANS, 8 MI GRAPES, 7	21
24 CA APPLES, 9 TX GRAPEFRUIT, 9 WA GRAPEFRUIT, 5 NY GRAPES, 9 MI LETTUCE, 6 CA POTATOES, 14	25 CA APPLES, 5 TX APPLES, 9 TX BANANA, 1 MI CELERY, 7 MI LETTUCE, 1 NY LETTUCE, 9 FL ORANGES, 8 WA PEACHES, 5	26 FL BANANA, 8 TX BANANA, 8 NY GREEN BEANS, 1 WA GREEN BEANS, 4 MI GRAPEFRUIT, 7 CA GRAPES, 14 NY ORANGES, 9 FL PEACHES, 8	27 NY PEACHES, 9	28

TOTAL NUMBER OF SAMPLES: 503
TOTAL OF 10 COMMODITIES

APPENDIX 1

STATE SAMPLING COLLECTION DATES

MARCH 1992

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
2 NY APPLES, 9 CA CELERY, 7 CA LETTUCE, 14 WA ORANGES, 5	3 FL APPLES, 8 WA APPLES, 5 CA CELERY, 7 TX CELERY, 9 FL GREEN BEANS, 8	4 CA GREEN BEANS, 14 WA GREEN BEANS, 4 TX PEACHES, 9	5 MI CELERY, 7 FL GRAPEFRUIT, 8 NY GRAPES, 9 CA PEACHES, 14	6
9 MI APPLES, 7 NY GREEN BEANS, 8 TX GREEN BEANS, 8 WA GRAPEFRUIT, 5	10 CA APPLES, 7 FL BANANA, 8 MI BANANA, 6 CA GRAPEFRUIT, 14 NY GRAPEFRUIT, 9 WA PEACHES, 4 TX POTATOES, 8	11 CA APPLES, 7 MI BANANA, 1 MI LETTUCE, 5 WA LETTUCE, 5 MI ORANGES, 7 NY PEACHES, 7	12 NY BANANA, 9 FL GRAPES, 8 MI LETTUCE, 2 NY PEACHES, 2	13 NY GREEN BEANS, 1
16 TX GRAPES, 9 WA GRAPES, 5 MI PEACHES, 5	17 TX LETTUCE, 8 MI PEACHES, 1	18 FL CELERY, 8 MI GRAPES, 7 TX LETTUCE, 1 FL ORANGES, 8 TX ORANGES, 9 WA POTATOES, 5	19	20 TX GRAPEFRUIT, 2 FL POTATOES, 8
23 WA BANANA, 5 NY CELERY, 9 MI GREEN BEANS, 6 TX GRAPEFRUIT, 7	24 TX APPLES, 9 MI GREEN BEANS, 1 NY LETTUCE, 9	25 TX BANANA, 9 CA GRAPES, 14 FL LETTUCE, 8 CA ORANGES, 14 NY ORANGES, 9 FL PEACHES, 4 MI POTATOES, 7	26 NY POTATOES, 9	27
30 CA BANANA, 7 WA CELERY, 5 MI GRAPEFRUIT, 6 CA POTATOES, 7	31 CA BANANA, 7 CA POTATOES, 7			

TOTAL NUMBER OF SAMPLES: 510
TOTAL OF 10 COMMODITIES

APPENDIX 1

STATE SAMPLING COLLECTION DATES

APRIL 1992

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		1 MI APPLES, 7 WA APPLES, 5 FL CELERY, 8 TX CELERY, 9	2 MI CELERY, 7 NY GRAPES, 9	3
6 CA APPLES, 14 CA GREEN BEANS, 12 TX GREEN BEANS, 1 WA LETTUCE, 5 CA ORANGES, 1	7 CA GREEN BEANS, 1 FL GREEN BEANS, 8 TX GREEN BEANS, 7 WA GRAPEFRUIT, 5 FL ORANGES, 8 NY ORANGES, 9	8 NY BANANA, 8 WA CELERY, 4 CA GREEN BEANS, 1 MI GRAPEFRUIT, 7 CA ORANGES, 13 TX POTATOES, 9	9 NY BANANA, 1 NY CELERY, 9 WA CELERY, 1 MI GRAPES, 7	10 FL BANANA, 8
13 CA BANANA, 4 NY GRAPEFRUIT, 9 TX GRAPES, 9 WA ORANGES, 5	14 CA BANANA, 10 MI BANANA, 7 WA BANANA, 5 TX LETTUCE, 9	15 WA GREEN BEANS, 4 FL LETTUCE, 7 TX ORANGES, 9 FL PEACHES, 2 CA POTATOES, 14	16 NY GREEN BEANS, 8 CA GRAPES, 14	17
20 NY APPLES, 7 NY GREEN BEANS, 1 CA GRAPEFRUIT, 7 TX GRAPEFRUIT, 8 WA POTATOES, 5	21 NY APPLES, 2 CA GRAPEFRUIT, 7 MI LETTUCE, 7 NY POTATOES, 9	22 FL APPLES, 8 TX APPLES, 9 CA CELERY, 14 FL GRAPEFRUIT, 8 MI ORANGES, 7 WA PEACHES, 2	23 MI GREEN BEANS, 6	24 FL GRAPES, 8
27 TX BANANA, 8 WA GRAPES, 5 NY LETTUCE, 9 CA PEACHES, 12 MI POTATOES, 7	28 TX BANANA, 1 CA LETTUCE, 7 FL POTATOES, 7	29 CA LETTUCE, 7 NY PEACHES, 5	30 NY PEACHES, 1	

TOTAL NUMBER OF SAMPLES: 484
TOTAL OF 10 COMMODITIES

APPENDIX 1

STATE SAMPLING COLLECTION DATES

MAY 1992

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
				1
4 NY APPLES, 9 CA CELERY, 14 TX CELERY, 8 MI GREEN BEANS, 7 WA GREEN BEANS, 5 CA GRAPEFRUIT, 14	5 TX CELERY, 1 WA GRAPEFRUIT, 5 MI ORANGES, 7 FL PEACHES, 2 TX PEACHES, 5	6 TX GREEN BEANS, 9 CA LETTUCE, 7 WA POTATOES, 5	7 FL GREEN BEANS, 8 CA LETTUCE, 7 FL ORANGES, 8 CA POTATOES, 14	8
11 MI GRAPEFRUIT, 7 NY GRAPES, 1 TX GRAPES, 2 WA GRAPES, 5 NY POTATOES, 9 TX POTATOES, 9	12 FL APPLES, 7 NY CELERY, 9 WA CELERY, 4 CA GRAPES, 10 TX GRAPES, 5 FL POTATOES, 8 MI POTATOES, 7	13 WA BANANA, 5 MI LETTUCE, 7 NY LETTUCE, 8 TX LETTUCE, 9 CA ORANGES, 7 CA PEACHES, 4 MI PEACHES, 7	14 FL LETTUCE, 1 CA ORANGES, 7 CA PEACHES, 7 NY PEACHES, 9	15 FL LETTUCE, 7 NY LETTUCE, 1
18 NY GRAPES, 8 TX ORANGES, 9 WA PEACHES, 5	19 CA APPLES, 14 WA APPLES, 5 CA BANANA, 14 NY GREEN BEANS, 9 TX GRAPEFRUIT, 9	20 TX APPLES, 9 FL BANANA, 8 FL GRAPEFRUIT, 8 MI GRAPES, 7 WA LETTUCE, 5	21 NY BANANA, 9 MI CELERY, 7	22
25	26 MI APPLES, 7 TX BANANA, 9 NY ORANGES, 9 WA ORANGES, 5	27 FL CELERY, 8 CA GREEN BEANS, 14	28 MI BANANA, 7 NY GRAPEFRUIT, 9 FL GRAPES, 7	29

TOTAL NUMBER OF SAMPLES: 498
TOTAL OF 10 COMMODITIES

APPENDIX 1

STATE SAMPLING COLLECTION DATES

JUNE 1992

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1 MI APPLES, 6 TX GREEN BEANS, 9 CA ORANGES, 3 NY ORANGES, 9 WA POTATOES, 5	2 NY CELERY, 9 WA GRAPEFRUIT, 5 CA LETTUCE, 7 FL LETTUCE, 8 CA ORANGES, 9 MI ORANGES, 7 CA PEACHES, 1 FL POTATOES, 8	3 TX CELERY, 9 WA CELERY, 5 CA LETTUCE, 7 CA ORANGES, 2	4 CA APPLES, 14 MI GRAPES, 7 NY LETTUCE, 9 CA PEACHES, 11 TX PEACHES, 9	5
8 TX APPLES, 7 NY GRAPEFRUIT, 9 WA LETTUCE, 5 MI PEACHES, 7	9 TX APPLES, 1 CA BANANA, 13 NY GRAPES, 8 WA GRAPES, 5 TX LETTUCE, 9	10 FL CELERY, 8 FL GREEN BEANS, 8 WA GREEN BEANS, 3 TX GRAPES, 6	11 MI BANANA, 7 FL GRAPEFRUIT, 8 MI GRAPEFRUIT, 7 CA POTATOES, 14	12 WA PEACHES, 2
15 TX BANANA, 9 MI GREEN BEANS, 7 NY GREEN BEANS, 9 CA GRAPES, 9 WA PEACHES, 3	16 FL APPLES, 8 CA GRAPES, 2 WA ORANGES, 5	17 CA GREEN BEANS, 14	18 MI POTATOES, 7 TX POTATOES, 9	19 FL PEACHES, 7
22 WA APPLES, 5 NY BANANA, 9 MI CELERY, 7 CA GRAPEFRUIT, 7 TX ORANGES, 6	23 WA BANANA, 5 CA GRAPEFRUIT, 7 TX ORANGES, 2	24 FL BANANA, 6 CA CELERY, 7 FL GRAPES, 8 FL ORANGES, 7 NY POTATOES, 9	25 NY APPLES, 9 FL BANANA, 2 CA CELERY, 7 FL ORANGES, 1	26 TX GRAPEFRUIT, 9
29	30 MI LETTUCE, 7 NY PEACHES, 8			

TOTAL NUMBER OF SAMPLES: 503
TOTAL OF 10 COMMODITIES

APPENDIX 2

SAMPLING REGIONS BY STATE

REGION	NUMBER OF SITES	PERCENT SITES	NUMBER OF SAMPLES	PERCENT SAMPLES
CALIFORNIA				
AVENAL	1	0.4%	5	0.7%
BAKERSFIELD	3	1.1%	14	1.8%
BYRON	1	0.4%	0	0.0%
CHICO	1	0.4%	4	0.5%
COLTON	1	0.4%	1	0.1%
DELANO	1	0.4%	0	0.0%
EAST BAY (OAKLAND)	31	10.9%	139	18.1%
FAIRFIELD	2	0.7%	2	0.3%
FRESNO	10	3.5%	35	4.6%
LAKE TAHOE	1	0.4%	2	0.3%
LOS ANGELES BASIN	119	41.9%	281	36.5%
MADERA	1	0.4%	5	0.7%
MERCED	1	0.4%	7	0.9%
MONTEREY BAY AREA	4	1.4%	12	1.6%
OXNARD AREA	2	0.7%	0	0.0%
REDDING	2	0.7%	4	0.5%
SACRAMENTO	28	9.9%	58	7.5%
SAN DIEGO AREA	11	3.9%	19	2.5%
SAN JOSE	1	0.4%	3	0.4%
SAN LUIS OBISPO AREA	2	0.7%	1	0.1%
STOCKTON AREA	6	2.1%	14	1.8%
UKIAH	1	0.4%	2	0.3%
VISALIA	1	0.4%	4	0.5%
WEST BAY (SAN FRAN)	52	18.3%	155	20.2%
YUBA CITY AREA	1	0.4%	2	0.3%
TOTAL:	284	100.0%	769	100.0%
FLORIDA				
GREEN COVE SPRINGS	1	4.2%	25	5.7%
JACKSONVILLE	5	20.8%	105	24.1%
LAKELAND	1	4.2%	17	3.9%
MIAMI	3	12.5%	24	5.5%
ORLANDO	2	8.3%	48	11.0%
PLANT CITY	2	8.3%	23	5.3%
POMPANO BEACH	5	20.8%	87	20.0%
TAMPA/ST. PETERSBURG	5	20.8%	106	24.4%
TOTAL:	24	100.0%	435	100.0%
MICHIGAN				
ANN ARBOR AREA	4	8.5%	38	9.8%
BATTLE CREEK	1	2.1%	12	3.1%
BAY CITY AREA	1	2.1%	9	2.3%
BRIGHTON	1	2.1%	12	3.1%
CADILLAC	1	2.1%	18	4.7%
DECATUR	1	2.1%	7	1.8%
DETROIT AREA	17	36.2%	129	33.4%
FLINT	2	4.3%	10	2.6%
GRAND RAPIDS	7	14.9%	65	16.8%
KALAMAZOO	1	2.1%	6	1.6%
LANSING	6	12.8%	50	13.0%
NILES	1	2.1%	12	3.1%
SAGINAW	1	2.1%	12	3.1%
STANDISH	1	2.1%	6	1.6%
TRAVERSE CITY	2	4.3%	0	0.0%
TOTAL:	47	100.0%	386	100.0%

APPENDIX 2

SAMPLING REGIONS BY STATE

REGION	NUMBER OF SITES	PERCENT SITES	NUMBER OF SAMPLES	PERCENT SAMPLES
NEW YORK				
ALBANY	12	6.4%	60	11.8%
ALBION	1	0.5%	0	0.0%
BUFFALO	28	15.0%	78	15.4%
BYRON	1	0.5%	0	0.0%
CANASTOTA	3	1.6%	3	0.6%
CASTILE	1	0.5%	0	0.0%
CHITTENANGO	2	1.1%	0	0.0%
HORSEHEADS	1	0.5%	4	0.8%
ITHACA	1	0.5%	5	1.0%
JAMESTOWN	4	2.1%	13	2.6%
LOCKPORT/BATAVIA	1	0.5%	1	0.2%
LONG ISLAND	12	6.4%	40	7.9%
MARION	2	1.1%	1	0.2%
NEW YORK CITY	80	42.8%	179	35.3%
NORWICH	1	0.5%	7	1.4%
ONTARIO	1	0.5%	0	0.0%
OSWEGO	3	1.6%	0	0.0%
PLATTSBURG AREA	1	0.5%	0	0.0%
ROCHESTER	9	4.8%	40	7.9%
SCHOHARIE	1	0.5%	1	0.2%
SOUTHEAST NEW YORK	13	7.0%	27	5.3%
SYRACUSE	8	4.3%	41	8.1%
WILLSBORO	1	0.5%	7	1.4%
TOTAL:	187	100.0%	507	100.0%
TEXAS				
AMARILLO	1	3.1%	17	3.5%
BRENHAM	1	3.1%	22	4.5%
DALLAS/FORT WORTH	8	25.0%	139	28.5%
EL PASO	1	3.1%	20	4.1%
HOUSTON	8	25.0%	144	29.6%
LUBBOCK	2	6.3%	33	6.8%
LUFKIN	3	9.4%	17	3.5%
SAN ANTONIO	7	21.9%	75	15.4%
TYLER	1	3.1%	20	4.1%
TOTAL:	32	100.0%	487	100.0%
WASHINGTON				
SEATTLE/TACOMA	14	77.8%	219	79.6%
SPOKANE	3	16.7%	33	12.0%
YAKIMA	1	5.6%	23	8.4%
TOTAL:	18	100.0%	275	100.0%
GRAND TOTAL:	592		2859	

APPENDIX 3

SAMPLE PROFILE BY ORIGIN (Domestic/Import)*

STATE	AP	BN	CE	GB	GF	GR	LT	OG	PC	PO	TOTAL
States = 31											
ARIZONA	–	–	–	1	30	1	12	8	1	5	58
ARKANSAS	–	–	–	–	–	–	–	1A	–	–	0
CALIFORNIA	10	–	179	48	122	40	270	236	73	54	1032
COLORADO	1	–	–	–	–	1	–	–	–	8	10
CONNECTICUT	1	–	–	–	–	–	–	–	–	–	1
DELAWARE	–	–	–	–	–	–	–	–	–	1	1
FLORIDA	–	–	60	121	148	2	17	58	3	21	430
GEORGIA	–	–	–	16	–	–	–	–	13	–	29
IDAHO	22	–	–	–	–	–	–	–	–	71	93
MAINE	–	–	–	–	–	–	–	–	–	8	8
MARYLAND	1	–	–	–	–	–	–	–	–	–	1
MASSACHUSETTS	4	–	–	–	–	–	–	–	–	–	4
MICHIGAN	16	–	2	1	1A	–	1	1A	1	15	36
MINNESOTA	1	–	–	–	–	–	1	1A	–	6	8
MONTANA	–	–	–	–	–	–	–	–	–	2	2
NEVADA	–	–	–	–	–	–	–	–	–	3	3
NEW MEXICO	–	–	–	–	–	–	2	–	–	–	2
NEW YORK	30	–	1	14	1A	–	3	2A	–	21	69
NORTH CAROLINA	–	–	–	–	–	–	–	–	1	–	1
OHIO	–	–	–	2	–	–	–	–	–	–	2
OKLAHOMA	–	–	–	–	–	–	–	–	–	2	2
OREGON	3	–	–	–	–	–	–	–	–	28	31
PENNSYLVANIA	3	–	–	–	–	–	–	–	–	–	3
SOUTH CAROLINA	–	–	–	2	–	–	–	–	3	–	5
TENNESSEE	–	–	–	4	–	–	–	–	–	–	4
TEXAS	–	–	14	3	3	–	1	3	4	15	43
UTAH	5	–	–	–	–	–	–	–	–	–	5
VERMONT	4	–	–	–	–	–	–	–	–	–	4
WASHINGTON	191	–	–	2	1A	–	3	–	–	38	234
WEST VIRGINIA	1	–	–	–	–	–	–	–	–	–	1
WISCONSIN	–	–	–	–	–	–	–	–	–	10	10
TOTAL	293	–	256	214	306	44	310	310	99	308	2140

APPENDIX 3

SAMPLE PROFILE BY ORIGIN (Domestic/Import)*

COUNTRY	AP	BN	CE	GB	GF	GR	LT	OG	PC	PO	TOTAL
Countries = 13											
ARGENTINA	1	–	–	–	–	–	–	–	–	–	1
BAHAMAS	–	–	–	–	3	–	–	–	–	–	3
CANADA	5	–	–	–	–	–	–	–	–	1	6
CHILE	3	3	–	–	–	227	–	–	92	–	325
COLOMBIA	–	34	–	–	–	–	–	–	–	–	34
COSTA RICA	–	49	–	–	–	–	–	–	–	–	49
ECUADOR	–	102	–	–	–	–	–	–	–	–	102
GUATEMALA	–	24	–	–	–	–	–	–	–	–	24
HONDURAS	–	25	–	–	–	–	–	–	–	–	25
MEXICO	–	46	3	23	–	14	–	–	8	–	94
MOROCCO	–	–	–	–	–	–	–	1	–	–	1
NEW ZEALAND	7	–	–	–	–	–	–	–	2	–	9
VENEZUELA	–	4	–	–	–	–	–	–	–	–	4
TOTAL	16	287	3	23	3	241	–	1	102	1	677
Origin Not Available =	–	24	–	1	1	12	–	–	4	–	**42
GRAND TOTAL:	309	311	259	238	310	297	310	311	205	309	2859

*–Sample origin is identified by grower or packing company.

**–40 of the "Origin Not Available" samples are imported; 2 are domestic.

A–Sample origin is identified by location of packing company only; samples are of domestic origin.

AP–APPLES
BN–BANANAS
CE–CELERY
GB–GREEN BEANS
GF–GRAPEFRUIT
GR–GRAPES
LT–LETTUCE
OG–ORANGES
PC–PEACHES
PO–POTATOES

APPENDIX 4

SAMPLING PERIOD AND DISTRIBUTION BY COMMODITY

COMMODITY	SAMPLING PERIOD	TOTAL # OF SAMPLES	IMPORT SAMPLES		DOMESTIC SAMPLES	
			NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
APPLES	January	52	1	1.9%	51	98.1%
	February	52	2	3.8%	50	96.2%
	March	52	1	1.9%	51	98.1%
	April	52	0	0.0%	52	100.0%
	May	51	5	9.8%	46	90.2%
	June	50	7	14.0%	43	86.0%
Total:		**309**	**16**	**5.2%**	**293**	**94.8%**
BANANAS	January	52	52	100.0%	0	0.0%
	February	52	52	100.0%	0	0.0%
	March	52	52	100.0%	0	0.0%
	April	52	52	100.0%	0	0.0%
	May	52	52	100.0%	0	0.0%
	June	51	51	100.0%	0	0.0%
Total:		**311**	**311**	**100.0%**	**0**	**0.0%**
CELERY*	February	52	0	0.0%	52	100.0%
	March	52	1	1.9%	51	98.1%
	April	52	2	3.8%	50	96.2%
	May	51	0	0.0%	51	100.0%
	June	52	0	0.0%	52	100.0%
Total:		**259**	**3**	**1.2%**	**256**	**98.8%**

APPENDIX 4

SAMPLING PERIOD AND DISTRIBUTION BY COMMODITY

COMMODITY	SAMPLING PERIOD	TOTAL # OF SAMPLES	IMPORT SAMPLES		DOMESTIC SAMPLES	
			NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
GREEN BEANS*	February	37	9	24.3%	28	75.7%
	March	50	10	20.0%	40	80.0%
	April	49	4	8.2%	45	91.8%
	May	52	1	1.9%	51	98.1%
	June	50	0	0.0%	50	100.0%
Total:		**238**	**24**	**10.1%**	**214**	**89.9%**
GRAPEFRUIT	January	52	2	3.8%	50	96.2%
	February	52	0	0.0%	52	100.0%
	March	51	1	2.0%	50	98.0%
	April	51	0	0.0%	51	100.0%
	May	52	0	0.0%	52	100.0%
	June	52	0	0.0%	52	100.0%
Total:		**310**	**3**	**1.0%**	**307**	**99.0%**
GRAPES	January	51	42	82.4%	9	17.6%
	February	52	50	96.2%	2	3.8%
	March	52	51	98.1%	1	1.9%
	April	52	52	100.0%	0	0.0%
	May	45	41	91.1%	4	8.9%
	June	45	17	37.8%	28	62.2%
Total:		**297**	**253**	**85.2%**	**44**	**14.8%**

APPENDIX 4

SAMPLING PERIOD AND DISTRIBUTION BY COMMODITY

COMMODITY	SAMPLING PERIOD	TOTAL # OF SAMPLES	IMPORT SAMPLES		DOMESTIC SAMPLES	
			NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
LETTUCE	January	51	0	0.0%	51	100.0%
	February	52	0	0.0%	52	100.0%
	March	52	0	0.0%	52	100.0%
	April	51	0	0.0%	51	100.0%
	May	52	0	0.0%	52	100.0%
	June	52	0	0.0%	52	100.0%
Total:		**310**	**0**	**0.0%**	**310**	**100.0%**
ORANGES	January	52	0	0.0%	52	100.0%
	February	52	1	1.9%	51	98.1%
	March	52	0	0.0%	52	100.0%
	April	52	0	0.0%	52	100.0%
	May	52	0	0.0%	52	100.0%
	June	51	0	0.0%	51	100.0%
Total:		**311**	**1**	**0.3%**	**310**	**99.7%**
PEACHES*	February	50	49	98.0%	1	2.0%
	March	46	46	100.0%	0	0.0%
	April	22	9	40.9%	13	59.1%
	May	39	1	2.6%	38	97.4%
	June	48	0	0.0%	48	100.0%
Total:		**205**	**105**	**51.2%**	**100**	**48.8%**

APPENDIX 4

SAMPLING PERIOD AND DISTRIBUTION BY COMMODITY

COMMODITY	SAMPLING PERIOD	TOTAL # OF SAMPLES	IMPORT SAMPLES		DOMESTIC SAMPLES	
			NUMBER	PERCENTAGE	NUMBER	PERCENTAGE
POTATOES	January	51	0	0.0%	51	100.0%
	February	52	1	1.9%	51	98.1%
	March	51	0	0.0%	51	100.0%
	April	51	0	0.0%	51	100.0%
	May	52	0	0.0%	52	100.0%
	June	52	0	0.0%	52	100.0%
Total:		309	1	0.3%	308	99.7%
GRAND TOTAL:		2859	717	25.1%	2142	74.9%

* Commodity sampling was not implemented until February 1992

APPENDIX 5. EPA TARGETED PESTICIDES IN PDP - TOLERANCES (ppm)

COMPOUND*	40CFR 180	COMMODITIES**									
		AP 9/91	BN 9/91	CE 2/92	GB 2/92	GF 8/91	GR 5/91	LT 5/91	OG 8/91	PC 2/92	PO 5/91
2,4-D[B,C]	.142	5	NT	NT	NT	5	0.5	NT	5	.2	0.2
ACEPHATE (11/91)	.108	NT	NT	10(E)	3(E)	NT	NT	10(E)	NT	NT	NT
ATRAZINE (3/92)	.220	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BENOMYL[A] (5/92)	.294	7.0	0.2	3.0	2.0	10.0	10.0	NT	10.0	15.0	NT
BROMOXYNIL[G]	.324	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
CHLORPYRIFOS (5/91)	.342	1.5	0.05	NT	0.05	1.0	0.5(R1)	NT	1.0	0.05	NT
DICLORAN (5/91)	.200	NT	NT	15	20	NT	10	10	NT	20	0.25
DICOFOL (10/91)	.163	5	NT	NT	5	10	5	NT	10	10	NT
HCB (5/91)[H] (Hexachlorobenzene)	.291	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
IPRODIONE (5/91)	.399	NT	NT	NT(18)	2.0	NT	60.0	25.0	NT	20.0	NT
LINDANE[AG] (5/91)	.133	1	NT	1	0.5[AG]	0.5[AG]	1	3	0.5[AG]	1	0.5[AG]
METHAMIDOPHOS(11/91)	.315	NT	NT	1(R2,F)	NT(D)	NT	NT	1	NT	NT	.1(N)
METHOXYCHLOR (5/91)	.120	14	NT	NT	14	NT	14	10	NT	14	1
PCB[H] (3/92) (Pentachlorobenzene)	.291	NT	@	NT	@	NT	NT	NT	NT	NT	@
PCNB (5/91) (Quintozene)	.291 .319	NT	0.1(I)	NT	0.1(I)	NT	NT	NT	NT	NT	0.1(I)
PERMETHRINS (5/91)	.378	0.05	NT	5.0	NT	NT	NT	20.0	NT	5.0	0.05

APPENDIX 5. EPA TARGETED PESTICIDES IN PDP - TOLERANCES (ppm)

* Other common name shown in parenthesis. Dates of inclusion in PDP are shown under commodity and next to each pesticide.

** AP= apples BN= bananas CE= celery GB= green beans GF= grapefruit
GR= grapes LT= lettuce OG= oranges PC= peaches PO= potatoes
All Tolerances are in parts per million.

A Being tested in apples, bananas, broccoli, and green beans only at the APHIS Gulfport, MS laboratory.

B Being tested in apples, grapes, grapefruit, oranges, and potatoes only. New York began testing their own samples in 4/92.

C See 40 CFR for special applications for western ditches and water hyacinth control for celery and lettuce.

D Under 40CFR 180.315 there is no tolerance for methamidophos in green beans. However, 40CFR 180.108 specifies that for a mixture of acephate and its metabolite methamidophos there is a combined tolerance of 3 ppm of which not more than 1 ppm can be methamidophos.

E This is a combined tolerance for acephate and its metabolite methamidophos of which not more than 1 ppm can be methamidophos.

F Under 40CFR 180.315 there is no tolerance for methamidophos in celery, but there is a regional tolerance for Florida of 1ppm. However, 40CFR 180.108 specifies that for a mixture of acephate and its metabolite methamidophos there is a combined tolerance of 10 ppm of which not more than 1 ppm can be methamidophos.

G Being tested in apples, grapes, grapefruit, oranges and potatoes only. New York began testing their own samples in 4/92.

H Pentachlorobenzene (PCB) is not a pesticide. It is a breakdown product of pentachloronitrobenzene (PCNB) and is considered to be an environmental contaminant. HCB is listed as a subtolerance of PCNB.

@ Under 40CFR 180.291 pentachlorobenzene is not specifically listed as a degradation product of pentachloronitrobenzene, although two other degradation products are listed. However, according to 40 CFR 180.3(e), it is considered appropriate to use the tolerance for (PCNB), but as a combined tolerance for PCNB and PCB.

AG Administrative guidelines. AGs are sometimes used for pesticides for which there is not a registered use, but the pesticide is persistent in the environment (e.g., DDT). For lindane, 40CFR lists a mixture of Tolerances and AGs.

I Interim tolerance - For quintozene interim tolerances were established while petitions for negligible residues are pending and until action is completed on these petitions.

NT No Tolerance.

R1 Regional tolerance--East of Rocky Mountains.

R2 Regional tolerance--Florida.

N Negligible Residue Tolerance.

18 Section 18 Exemption: iprodione on Celery 40 ppm -- 13,000 acres in CA counties. Expires 7/21/93.

APPENDIX 6. OTHER PESTICIDES IN PDP - TOLERANCES (ppm)

COMPOUND@	40CFR 180	COMMODITIES**									
		AP	BN*	CE	GB	GF	GR	LT	OG	PC	PO
Anilazine (Dyrene)	.158	NT	NT	10	NT	NT	NT	NT	NT	NT	1
Azinphos-Methyl (Guthion)	.154	2.0	NT	2.0	2.0	2.0	5.0	NT	2.0	2.0	0.3
Captan	.103	25	NT	50	25(I)	NT	50	100	NT	50	25(I)
Carbaryl	.169	NT	10	10	10	10	10	10	10	10	0.2(N)
Chlorpropham (CIPC)	.181	NT	NT	NT	0.3(I)	NT	NT	NT	NT	NT	50
Chlorothalonil	.275	NT	0.05	15	5	NT	NT	NT	NT	0.5	0.1
Cypermethrin	.418	NT	NT	NT	NT	NT	NT	10.0(T-2)	NT	NT	NT
DDT - TDE - DDE(See also AG listing)	.147	---	NT	---	---	---	---	---	---	---	---
Dacthal (DCPA)	.185	NT	NT	NT	2	NT	NT	2	NT	NT	2
Diazinon	.153	0.5	0.1	0.7	0.5	0.7	0.75	0.7	0.7	0.7	0.1
Dichlorvos[D] (DDVP)	.235	NT	NT	NT	NT	NT	NT	1[A]	NT	NT	NT
Dimethoate	.204	2	NT	2	2	2	1	2	2	NT	0.2
Diphenylamine	.190	10	NT	NT	NT	NT	NT	NT	NT	NT	NT
Disulfoton	.183	NT	NT	NT	0.75	NT	NT	0.75	NT	NT	0.75
Endosulfans	.182	2.0	NT	2.0	2.0	NT	2.0	2.0	NT	2.0	0.2(N)
Ethion	.173	2.0	NT	NT	2.0	2.0	2.0	NT	2.0	1.0	NT
Ethoprop	.262	NT	0.02(N)	NT	0.02(N)	NT	NT	NT	NT	NT	0.02(N)
Ethyl Parathion (Parathion)	.121	1	NT	1	1	1	1	1	1	1	0.1(N)

APPENDIX 6. OTHER PESTICIDES IN PDP - TOLERANCES (ppm)

COMPOUND@	40CFR 180	COMMODITIES**									
		AP	BN*	GF	GR	GF	GR	LT	OG	PC	PO
Fenamiphos	.349	0.25	0.10	NT	NT	0.60	0.10	NT	0.60	0.25	NT
Imazalil	.413	NT	0.2	NT	NT	10	NT	NT	10	NT	NT
Malathion	.111	8	NT	8	8	8	8	8	8	8	8
Methidathion	.298	.05	NT	NT	NT	2.0	NT	NT	2.0	0.05(N)	0.2
Methomyl[B]	.253	1	NT	3	2	2	5	5	2	5	.2(N)
Methyl Parathion	.121	1	NT	1	1	1	1	1	1	1	0.1(N)
Mevinphos	.157	0.5	NT	1.0	0.25	0.2	0.5	0.5	0.2	1.0	0.25
Myclobutanil	.443	0.5	NT	NT	NT	NT	1.0	NT	NT	2.0(T-3)	NT
Naled[C]	.215	NT	NT	3	0.5	3	0.5	3	3	0.5	NT
Omethoate	.204	2	NT	2	2	2	1	2	2	NT	0.2
Parathion	.121	1	NT	1	1	1	1	1	1	1	0.1(N)
Phosalone	.263	10	NT	NT	NT	3.0	10.0	NT	3.0	15.0	0.1(N)
Phosmet	.261	10	NT	NT	NT	5	10	NT	5	10	0.1
Propargite	.259	3	NT	NT	20	5	10	NT	5	7	0.1
Thiabendazole	.242	10	0.4	NT	NT	10	10	NT	10	NT	10
Vinclozolin	.380	NT	NT	NT	NT	NT	6.0	10.0	NT	25.0	NT
ADMINISTRATIVE GUIDELINES:											
DDT - TDE - DDE	.147	0.1	NG	0.5	0.2	0.1	0.05	0.5	0.1	0.2	1

APPENDIX 6. OTHER PESTICIDES IN PDP - TOLERANCES (ppm)

@ Other common name shown in parenthesis.
* Tolerances are for edible portions only
** AP= apples BN= bananas CE= celery GB= green beans GF= grapefruit
GR= grapes LT= lettuce OG= oranges PC= peaches PO= potatoes
All Tolerances are in parts per million.

A Residues expressed as naled.
B Residues detected may include residues resulting from degradation of thiodicarb to methomyl.
C This is a combined tolerance of naled and its breakdown product dichlorvos (DDVP). Tolerance for naled may be used even if only DDVP is present since naled breaks down quickly.
D See naled
AG Administrative guidelines. AGs are sometimes used for pesticides for which there is not a registered use, but the pesticide is persistent in the environment (e.g., DDT).
I Interim tolerance.
T Temporary tolerance.
T-2 T-2 expires 7/1/93.
T-3 T-3 expires 10/1/94.
N Negligible Residue Tolerance.

APPENDIX 7. EPA TARGETED PESTICIDES IN PDP - LEVELS OF DETECTION (LODs) AND LEVELS OF QUANTITATION (LOQs) AVERAGED OVER ALL COMMODITIES*

PESTICIDES	APHIS		CA		FL		MI		NY		TX		WA	
	LOD	LOQ	LOQ	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
2,4-D	NA	NA	NA	NA	NA	NA	NA	NA	9	20	NA	NA	NA	NA
ACEPHATE	NA	NA	3	10	5	17	5	18	4	12	5	16	49	164
ATRAZINE	NA	NA	15	50	3	10	28	92	16	60	49	160	14	48
BENOMYL	50	100	This is a single analyte procedure performed only at NMRAL/APHIS											
BROMOXYNIL	NA	NA	NA	NA	NA	NA	NA	NA	2	5	NA	NA	NA	NA
CHLORPYRIFOS	NA	NA	8	25	3	10	11	37	3	10	6	20	8	26
DICLORAN	NA	NA	8	25	3	10	8	27	8	20	5	16	3	10
pp'-DICOFOL	NA	NA	15	50	14	33	15	50	5	16	18	60	13	48
HCB	NA	NA	3	10	3	10	4	12	1	6	4	10	3	10
IPRODIONE	NA	NA	15	60	40	130	60	200	10	50	9	28	24	80
LINDANE	NA	NA	3	10	5	17	4	14	2	10	4	20	5	17
METHAMIDOPHOS	NA	NA	3	10	5	17	3	11	3	8	4	12	15	51
METHOXYCHLOR	NA	NA	15	50	8	25	20	87	5	20	9	30	22	72
PCB	NA	NA	3	10	3	10	4	14	1	5	2	7	3	10
PERMETHRIN CIS	NA	NA	8	25	ND	ND	31	100	4	16	26	87	11	36
PERMETHRIN TRANS	NA	NA	8	25	ND	ND	31	100	4	16	26	87	12	39
PERMETHRIN TOTAL	NA	NA	ND	ND	15	75	ND	ND	ND	ND	ND	ND	ND	ND
QUINTOZENE (PCNB)	NA	NA	3	10	3	10	6	19	3	10	4	13	3	10

* LODs and LOQs were determined during the 1992 Method Validation Study. All LOD's and LOQs are in parts per billion.
NA: Not applicable, analysis not performed at that laboratory.
ND: Not determined, laboratory reporting permethrin as total or as the isomers.

APPENDIX 8. OTHER PESTICIDES IN PDP - LEVELS OF DETECTION (LODs) and LEVELS OF QUANTITATION (LOQs) AVERAGED OVER ALL COMMODITIES*

PESTICIDES	APHIS		CA		FL		MI		NY		TX		WA	
	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
ALDRIN[A]	NA	NA	---	---	---	---	---	---	---	---	9	30	---	---
AZINPHOS METHYL	NA	NA	15	50	30	100	29	95	25	80	24	80	46	150
CAPTAN	NA	NA	30	100	6	20	18	61	8	20	12	40	3	9
CARBARYL	NA	NA	15	50	20	66	---	---	10	40	---	---	---	---
CHLOROTHALONIL	NA	NA	15	50	---	---	14	46	8	25	7	24	1	3
CHLORPROPHAM	NA	NA	8	25	20	66	14	47	10	40	---	---	35	120
CHLORPYRIFOS METHYL[A]	NA	NA	3	10	3	10	---	---	---	---	2	8	22	68
DCPA (DACTHAL)	NA	NA	8	25	4	13	5	18	---	---	7	24	1	3
pp'-DDD	NA	NA	8	25	---	---	---	---	---	---	---	---	---	---
pp'-DDE	NA	NA	8	25	3	10	6	19	2	8	7	24	1	4
pp'-DDT	NA	NA	8	25	3	10	---	---	6	20	---	---	---	---
DDVP (DICHLORVOS)	NA	NA	---	---	---	---	---	---	---	---	3	10	---	---
DIAZINON	NA	NA	3	10	4	13	6	18	4	12	4	12	16	55
DIMETHOATE	NA	NA	3	10	11	36	6	19	3	8	6	20	14	46
DIPHENYLAMINE	NA	NA	---	---	10	33	9	29	10	25	---	---	140	480
DISULFOTON	NA	NA	---	---	---	---	---	---	---	---	7	24	60	200
ENDOSULFAN I	NA	NA	3	10	3	10	6	20	2	6	7	24	1	4
ENDOSULFAN II	NA	NA	3	10	3	10	6	19	3	10	7	24	2	5

APPENDIX 8. OTHER PESTICIDES IN PDP - LEVELS OF DETECTION (LODs) and LEVELS OF QUANTITATION (LOQs) AVERAGED OVER ALL COMMODITIES*

PESTICIDES	APHIS		CA		FL		MI		NY		TX		WA	
	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ	LOD	LOQ
ENDOSULFAN SULFATE	NA	NA	3	10	3	10	9	31	9	20	7	24	20	60
ETHION	NA	NA	3	10	6	20	4	10	2	4	4	12	16	54
IMAZALIL	NA	NA	30	100	---	---	11	38	8	30	610	2000	66	220
MALATHION	NA	NA	---	---	---	---	---	---	---	---	4	12	66	200
METHIDATHION	NA	NA	8	10	---	---	6	20	3	6	10	32	28	93
METHYL PARATHION	NA	NA	8	10	---	---	5	15	3	8	6	20	8	29
MEVINPHOS (PHOSDRIN)	NA	NA	---	---	---	---	---	---	---	---	7	12	20	260
MYCLOBUTANIL	NA	NA	30	100	10	33	41	104	12	50	61	200	34	110
OMETHOATE	NA	NA	---	---	---	---	9	28	5	16	---	---	21	69
PARATHION (ETHYL)	NA	NA	3	10	4	10	5	18	2	6	---	---	17	58
PHOSALONE	NA	NA	---	---	---	---	---	---	5	20	---	---	---	---
PHOSMET	NA	NA	8	25	6	76	16	52	10	30	20	80	41	140
THIABENDAZOLE	50	100	30	100	40	130	8	30	10	30	250	840	76	250
VINCLOZOLIN	NA	NA	8	25	4	13	12	41	4	16	14	48	2	5

* Non-Core LOD/LOQs are estimates based on historical data. All LODs and LOQs are in parts per billion.
A Aldrin and Chlorpyrifos Methyl are process standards.
NA Not applicable, analysis not performed at that laboratory.
--- Not available.

APPENDIX 9

DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

COMMODITY/PESTICIDE	NUMBER OF SAMPLES ANALYZED	NUMBER OF SAMPLES WITH RESIDUES DETECTED	PERCENT OF SAMPLES WITH RESIDUES DETECTED
APPLES			
Azinphos–Methyl	309	70	22.7%
Benomyl	95	10	10.5%
Captan	309	30	9.7%
Carbaryl	162	2	1.2%
Chlorothalonil(V=1)	309	1	0.3%
Chlorpropham(V=1)	309	1	0.3%
Chlorpyrifos	309	44	14.2%
Diazinon	309	8	2.6%
Dicofol	309	8	2.6%
Dimethoate	309	14	4.5%
Diphenylamine	309	108	35.0%
Endosulfans	309	37	12.0%
Ethion	309	14	4.5%
Omethoate	309	6	1.9%
Parathion	309	6	1.9%
Parathion–Methyl	309	21	6.8%
Phosalone	309	2	0.6%
Phosmet	309	5	1.6%
Thiabendazole*	253	129	51.0%
Vinclozolin(V=1)	309	1	0.3%
Total Residues Detected:		517	
Total number of samples analyzed: 309			
Total number of samples with positive findings: 239			
Percent of samples with residues detected: 77.3%			
Number of different pesticides detected: 20			
BANANAS			
Ethoprop	311	1	0.3%
Imazalil	311	5	1.6%
Thiabendazole(X=1)*	254	66	26.0%
Total Residues Detected:		72	
Total number of samples analyzed: 311			
Total number of samples with positive findings: 69			
Percent of samples with residues detected: 22.2%			
Number of different pesticides detected: 3			

APPENDIX 9

DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

COMMODITY/PESTICIDE	NUMBER OF SAMPLES ANALYZED	NUMBER OF SAMPLES WITH RESIDUES DETECTED	PERCENT OF SAMPLES WITH RESIDUES DETECTED
CELERY			
Acephate	259	58	22.4%
Anilazine	259	8	3.1%
Chlorothalonil	259	92	35.5%
Dacthal(V=3)	259	3	1.2%
DDE	259	10	3.9%
DDT	259	1	0.4%
Diazinon	259	9	3.5%
Dicloran	259	81	31.3%
Endosulfans	259	2	0.8%
Iprodione(V=2)	259	2	0.8%
Methamidophos	259	37	14.3%
Permethrins	259	95	36.7%
Total Residues Detected:		398	

Total number of samples analyzed: 259
Total number of samples with positive findings: 205
Percent of samples with residues detected: 79.2%
Number of different pesticides detected: 12

GREEN BEANS			
Acephate(X=1)	238	67	28.2%
Azinphos-Methyl	238	16	6.7%
Benomyl	93	8	8.6%
Chlorothalonil	238	26	10.9%
Chlorpyrifos	238	2	0.8%
Dacthal	238	7	2.9%
DDE	238	1	0.4%
Diazinon	238	2	0.8%
Dicloran	238	4	1.7%
Dimethoate	238	11	4.6%
Endosulfans	238	84	35.3%
Ethion	238	1	0.4%
Methamidophos(V=2)**	238	78	32.8%
Methoxychlor	238	1	0.4%
Omethoate	238	4	1.7%
Parathion	238	1	0.4%
Parathion-Methyl	238	1	0.4%
Permethrins(V=1)	238	1	0.4%
Quintozene	238	6	2.5%
Total Residues Detected:		321	

Total number of samples analyzed: 238
Total number of samples with positive findings: 157
Percent of samples with residues detected: 66.0%
Number of different pesticides detected: 19

APPENDIX 9

DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

COMMODITY/PESTICIDE	NUMBER OF SAMPLES ANALYZED	NUMBER OF SAMPLES WITH RESIDUES DETECTED	PERCENT OF SAMPLES WITH RESIDUES DETECTED
GRAPEFRUIT			
Diazinon	310	4	1.3%
Dicofol	310	1	0.3%
Ethion	310	10	3.2%
Imazalil	310	35	11.3%
Thiabendazole*	226	87	38.5%
Total Residues Detected:		137	

Total number of samples analyzed: 310
Total number of samples with positive findings: 109
Percent of samples with residues detected: 35.2%
Number of different pesticides detected: 5

GRAPES			
Azinphos–Methyl	297	4	1.3%
Captan	297	143	48.1%
Chlorpyrifos(X=1)	297	22	7.4%
Diazinon	297	3	1.0%
Dicloran	297	5	1.7%
Dicofol	297	3	1.0%
Dimethoate(X=1)	297	40	13.5%
Endosulfans	297	6	2.0%
Iprodione	297	118	39.7%
Methamidophos	297	1	0.3%
Mevinphos	297	1	0.3%
Myclobutanil	297	11	3.7%
Omethoate	297	16	5.4%
Parathion(X=1)	297	4	1.3%
Parathion–Methyl	297	1	0.3%
Vinclozolin	297	132	44.4%
Total Residues Detected:		510	

Total number of samples analyzed: 297
Total number of samples with positive findings: 235
Percent of samples with residues detected: 79.1%
Number of different pesticides detected: 16

APPENDIX 9

DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

COMMODITY/PESTICIDE	NUMBER OF SAMPLES ANALYZED	NUMBER OF SAMPLES WITH RESIDUES DETECTED	PERCENT OF SAMPLES WITH RESIDUES DETECTED
LETTUCE			
Acephate	310	22	7.1%
Chlorothalonil(V=1)	310	1	0.3%
Chlorpyrifos(V=1)	310	1	0.3%
Cypermethrin	310	1	0.3%
Dacthal	310	7	2.3%
DDE	310	8	2.6%
DDT	310	1	0.3%
Dimethoate	310	17	5.5%
Disulfoton Sulfone	310	3	1.0%
Endosulfans	310	46	14.8%
Iprodione	310	1	0.3%
Methamidophos	310	8	2.6%
Mevinphos	310	2	0.6%
Omethoate	310	2	0.6%
Parathion–Methyl	310	1	0.3%
Permethrins	310	30	9.7%
Total Residues Detected:		151	

Total number of samples analyzed: 310
Total number of samples with positive findings: 105
Percent of samples with residues detected: 33.9%
Number of different pesticides detected: 16

ORANGES			
2,4–D (NY only)	27	2	7.4%
Chlorpyrifos	311	8	2.6%
Dicofol	311	2	0.6%
Dimethoate	311	4	1.3%
Ethion	311	10	3.2%
Imazalil	311	85	27.3%
Methidathion	311	6	1.9%
Thiabendazole*	227	98	43.2%
Total Residues Detected:		215	

Total number of samples analyzed: 311
Total number of samples with positive findings: 145
Percent of samples with residues detected: 46.6%
Number of different pesticides detected: 8

APPENDIX 9

DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

COMMODITY/PESTICIDE	NUMBER OF SAMPLES ANALYZED	NUMBER OF SAMPLES WITH RESIDUES DETECTED	PERCENT OF SAMPLES WITH RESIDUES DETECTED
PEACHES			
Azinphos-Methyl	205	28	13.7%
Captan	205	27	13.2%
Carbaryl	25	1	4.0%
Chlorpyrifos	205	25	12.2%
DDT	205	1	0.5%
Diazinon	205	11	5.4%
Dichlorvos	205	1	0.5%
Dicloran	205	86	42.0%
Dimethoate(V=1)	205	1	0.5%
Endosulfans	205	15	7.3%
Iprodione	205	92	44.9%
Mevinphos	205	3	1.5%
Parathion	205	7	3.4%
Parathion-Methyl	205	17	8.3%
Permethrins	205	3	1.5%
Phosmet	205	20	9.8%
Propargite (FL only)	23	2	8.7%
Vinclozolin	205	4	2.0%
Total Residues Detected:		344	

Total number of samples analyzed: 205
Total number of samples with positive findings: 169
Percent of samples with residues detected: 82.4%
Number of different pesticides detected: 18

APPENDIX 9

DISTRIBUTION OF RESIDUES DETECTED BY COMMODITY

COMMODITY/PESTICIDE	NUMBER OF SAMPLES ANALYZED	NUMBER OF SAMPLES WITH RESIDUES DETECTED	PERCENT OF SAMPLES WITH RESIDUES DETECTED
POTATOES			
Chlorpropham	309	210	68.0%
DDE	309	36	11.7%
DDT	309	7	2.3%
Dicloran	309	1	0.3%
Dimethoate	309	1	0.3%
Endosulfans	309	23	7.4%
Methidathion	309	1	0.3%
Phorate Sulfone	309	1	0.3%
Quintozene	309	1	0.3%
Thiabendazole*	225	23	10.2%
Total Residues Detected:		304	

Total number of samples analyzed: 309
Total number of samples with positive findings: 231
Percent of samples with residues detected: 74.8%
Number of different pesticides detected: 10

PESTICIDES DETECTED TOTAL	NUMBER ANALYZED	TOTAL SAMPLES NUMBER WITH RESIDUE DETECTED	PERCENT WITH RESIDUE DETECTED
42	2859	1664	58.2%

TOTAL NUMBER OF RESIDUES DETECTED
2969

* Compound was not analyzed by California

** All other residues were found in combination with Acephate.
(V) Residue was found where no Tolerance was established by EPA
(X) Residue exceeds EPA Tolerance

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
A. ORIGINAL EPA LIST (Modified through January 1992)							
2,4-D (1)							
Apr-May	ORANGES	NY	27	2	7.4	BQL-14B	14B
			Total # of samples with residues detected =				2
ACEPHATE							
Feb-Jun	CELERY	CA, FL, MI, NY, TX, WA	259	58	22.4	BQL-8B	1.7M
Feb-Jun	GREEN BEANS	CA, FL, MI, NY, TX, WA	238	67	28.2	BQL-7B	3.3M
Jan-Jun	LETTUCE	CA, FL, MI, NY, TX	310	22	7.1	BQL-5B	.77M
			Total # of samples with residues detected =				147
BENOMYL (2)							
May-Jun	APPLES	FL, MI, NY	95	10	10.5	BQL-.11M	.42M
May-Jun	GREEN BEANS	MI, TX, WA	93	8	8.6	50B	.23M
			Total # of samples with residues detected =				18
CHLORPYRIFOS							
Jan-Jun	APPLES	CA, FL, MI, NY, TX, WA	309	44	14.2	BQL-2B	.89M
Mar-Apr	GREEN BEANS	TX	238	2	0.8	BQL-3B	4B
Feb-Jun	GRAPES	CA, FL, MI, NY, TX, WA	297	22	7.4	BQL-3B	.77M
Apr	LETTUCE	NY	310	1	0.3	10B	10B
Jan-Jun	ORANGES	CA, MI, NY, TX	311	8	2.6	BQL-2B	10B
Feb-Jun	PEACHES	CA, FL, MI, NY, TX, WA	205	25	12.2	BQL-4B	66B
			Total # of samples with residues detected =				102

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
A. ORIGINAL EPA LIST (Modified through January 1992)							
DICLORAN							
Feb–Jun	CELERY	CA, FL, MI, NY, TX, WA	259	81	31.3	BQL–11B	4.1M
Mar–Jun	GREEN BEANS	CA, TX, WA	238	4	1.7	3B	.55M
Jan–May	GRAPES	CA, NY, TX	297	5	1.7	3B	1.1M
Feb–Jun	PEACHES	CA, FL, MI, NY, TX, WA	205	86	42.0	BQL–9B	2.9M
Feb	POTATOES	CA	309	1	0.3	7B	7B
			Total # of samples with residues detected =				177
DICOFOL							
Feb–May	APPLES	FL, MI, NY, TX	309	8	2.6	BQL–13B	.18M
May	GRAPEFRUIT	NY	310	1	0.3	30B	30B
Mar	GRAPES	CA, TX	297	3	1.0	6B	24B
Mar–May	ORANGES	NY, TX	311	2	0.6	30B	36B
			Total # of samples with residues detected =				14
IPRODIONE							
May	CELERY	NY, TX	259	2	0.8	49B	.29M
Jan–Jun	GRAPES	CA, FL, MI, NY, TX, WA	297	118	39.7	BQL–70B	3M
Apr	LETTUCE	CA	310	1	0.3	1.2M	1.2M
Feb–Jun	PEACHES	CA, FL, MI, NY, TX, WA	205	92	44.9	35B	16M
			Total # of samples with residues detected =				213

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
A. ORIGINAL EPA LIST (Modified through January 1992)							
METHAMIDOPHOS							
Feb–Jun	CELERY	CA, FL, MI, NY, TX, WA	259	37	14.3	BQL–2B	.12M
Feb–Jun	GREEN BEANS	CA, FL, MI, NY, TX, WA	238	78	32.8	BQL–4B	1.8M
Apr	GRAPES	NY	297	1	0.3	8B	8B
Jan–Jun	LETTUCE	CA, MI, NY, TX	310	8	2.6	BQL–3B	33B
				Total # of samples with residues detected =			124
METHOXYCHLOR							
Apr	GREEN BEANS	TX	238	1	0.4	5B	5B
				Total # of samples with residues detected =			1
PERMETHRINS							
Feb–Jun	CELERY	CA, FL, MI, NY, TX, WA	259	95	36.7	BQL–9B	3.9M
Mar	GREEN BEANS	CA	238	1	0.4	.85M	.85M
Jan–Jun	LETTUCE	CA, FL, MI, NY, TX, WA	310	30	9.7	6B	1.9M
May–Jun	PEACHES	CA, NY	205	3	1.5	15B	.21M
				Total # of samples with residues detected =			129
QUINTOZENE							
Mar–Jun	GREEN BEANS	TX, WA	238	6	2.5	1B	4B
Feb	POTATOES	CA	309	1	0.3	6B	6B
				Total # of samples with residues detected =			7

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
B. ADDITIONAL PESTICIDES FROM THE UPDATED EPA LIST (November 1992)							
AZINPHOS-METHYL							
Jan-Jun	APPLES	CA, FL, MI, NY, TX, WA	309	70	22.7	BQL-12B	.62M
Feb-May	GREEN BEANS	FL, MI, NY, TX	238	16	6.7	BQL-16B	.38M
Jan-Mar	GRAPES	NY, TX	297	4	1.3	16B	31M
Feb-Jun	PEACHES	CA, MI, NY, TX	205	28	13.7	BQL-4B	.74M
				Total # of samples with residues detected =			118
CHLOROTHALONIL							
May	APPLES	FL	309	1	0.3	BQL	BQL
Feb-Jun	CELERY	CA, FL, MI, NY, WA	259	92	35.5	BQL-6B	4.8M
Feb-Jun	GREEN BEANS	CA, FL, NY, WA	238	26	10.9	BQL-18B	1.6M
Jan	LETTUCE	FL	310	1	0.3	.23M	.23M
				Total # of samples with residues detected =			120
DIAZINON							
Feb-May	APPLES	CA, TX	309	8	2.6	6B	16B
Feb-Jun	CELERY	CA, MI, NY, TX	259	9	3.5	BQL-4B	68B
Apr-May	GREEN BEANS	TX	238	2	0.8	7B	99B
May	GRAPEFRUIT	TX	310	4	1.3	3B	7B
Jan-May	GRAPES	NY, TX	297	3	1.0	2B	6B
Feb-Mar	PEACHES	CA, NY, TX	205	11	5.4	4B	83B
				Total # of samples with residues detected =			37

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
B. ADDITIONAL PESTICIDES FROM THE UPDATED EPA LIST (November 1992)							
DICHLORVOS							
Feb	PEACHES	CA	205	1	0.5	59B	59B
			Total # of samples with residues detected =				1
DISULFOTON SULFONE							
Mar	LETTUCE	CA	310	3	1.0	42B	.16M
			Total # of samples with residues detected =				3
ENDOSULFANS							
Jan–Jun	APPLES	CA, FL, NY, TX, WA	309	37	12.0	BQL–2B	45B
Mar–May	CELERY	NY, TX	259	2	0.8	2B	.16M
Feb–Jun	GREEN BEANS	CA, FL, MI, NY, TX, WA	238	84	35.3	BQL–5B	.94M
Jun	GRAPES	TX	297	6	2.0	12B	71B
Jan–Jun	LETTUCE	CA, FL, MI, NY, TX, WA	310	46	14.8	BQL–4B	.22M
Feb–Jun	PEACHES	CA, NY, TX, WA	205	15	7.3	BQL–3B	.13M
Jan–Jun	POTATOES	CA, FL, MI, NY, TX	309	23	7.4	BQL–6B	.18M
			Total # of samples with residues detected =				213
ETHION							
Jan–Jun	APPLES	CA, FL, MI, NY, TX, WA	309	14	4.5	9B	1.7M
May	GREEN BEANS	MI	238	1	0.4	BQL	BQL
Jan–Jun	GRAPEFRUIT	CA, FL, MI, NY, TX	310	10	3.2	BQL–2B	22B
Jan–May	ORANGES	FL, MI, NY, TX	311	10	3.2	BQL–3B	25B
			Total # of samples with residues detected =				35

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
B. ADDITIONAL PESTICIDES FROM THE UPDATED EPA LIST (November 1992)							
METHIDATHION							
Apr–Jun	ORANGES	CA, MI, NY, TX	311	6	1.9	BQL–3B	36B
Jun	POTATOES	TX	309	1	0.3	4B	4B
				Total # of samples with residues detected =			7
MEVINPHOS							
Apr	GRAPES	NY	297	1	0.3	15B	15B
Mar–Mar	LETTUCE	CA	310	2	0.6	78B	78B
Apr	PEACHES	NY	205	3	1.5	.1M	.18M
				Total # of samples with residues detected =			6
PARATHION–METHYL							
Jan–Jun	APPLES	NY, TX	309	21	6.8	4B	81B
Mar	GREEN BEANS	NY	238	1	0.4	.16M	.16M
Feb	GRAPES	CA	297	1	0.3	32B	32B
Jun	LETTUCE	WA	310	1	0.3	.21M	.21M
Apr–Jun	PEACHES	CA, FL, MI, NY, TX	205	17	8.3	BQL–4B	.11M
				Total # of samples with residues detected =			41

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
C. OTHER PESTICIDES							
ANILAZINE							
Feb–May	CELERY	CA, WA	259	8	3.1	28B	2.2M
			Total # of samples with residues detected =				8
CAPTAN							
Jan–Jun	APPLES	CA, FL, MI, NY, TX, WA	309	30	9.7	BQL–37B	.64M
Jan–May	GRAPES	CA, FL, MI, NY, TX, WA	297	143	48.1	BQL–4B	3.4M
Feb–Jun	PEACHES	CA, FL, MI, NY, TX	205	27	13.2	BQL–11B	2.2M
			Total # of samples with residues detected =				200
CARBARYL							
Feb	APPLES	WA	162	2	1.2	80B	88B
Jun	PEACHES	FL	25	1	4.0	BQL	BQL
			Total # of samples with residues detected =				3
CHLORPROPHAM							
Mar	APPLES	NY	309	1	0.3	28B	28B
Jan–Jun	POTATOES	CA, FL, MI, NY, TX, WA	309	210	68.0	BQL–9B	9.1M
			Total # of samples with residues detected =				211

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
C. OTHER PESTICIDES							
CYPERMETHRIN							
May	LETTUCE	TX	310	1	0.3	.18M	.18M
Total # of samples with residues detected =							1
DACTHAL							
Mar–Jun	CELERY	TX	259	3	1.2	6B	41B
May–Jun	GREEN BEANS	CA, TX, WA	238	7	2.9	9B	13M
Jan–Jun	LETTUCE	CA, MI, TX	310	7	2.3	BQL–4B	20B
Total # of samples with residues detected =							17
DDE							
Feb–May	CELERY	FL, MI, NY, TX	259	10	3.9	BQL–3B	12B
Jun	GREEN BEANS	TX	238	1	0.4	2B	2B
Apr–Jun	LETTUCE	CA, NY, TX	310	8	2.6	2B	17B
Jan–Jun	POTATOES	CA, FL, MI, NY, TX, WA	309	36	11.7	BQL–2B	39B
Total # of samples with residues detected =							55
DDT							
Jun	CELERY	NY	259	1	0.4	12B	12B
May	LETTUCE	NY	310	1	0.3	27B	27B
Feb	PEACHES	NY	205	1	0.5	12B	12B
Jan–Jun	POTATOES	CA, NY	309	7	2.3	3B	19B
Total # of samples with residues detected =							10

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
C. OTHER PESTICIDES							
DIMETHOATE*							
Jan–Jun	APPLES	FL, MI, NY	309	14	4.5	BQL–36B	.2M
Feb–Jun	GREEN BEANS	FL, MI, NY, TX	238	11	4.6	16B	.78M
Jan–Jun	GRAPES	FL, MI, NY, TX, WA	297	40	13.5	4B	1.5M
Feb–Jun	LETTUCE	MI, NY, TX	310	17	5.5	BQL–4B	.21M
May–Jun	ORANGES	FL, TX	311	4	1.3	BQL–3B	14B
May	PEACHES	MI	205	1	0.5	BQL	BQL
Jun	POTATOES	TX	309	1	0.3	12B	12B
* Not analyzed by California			Total # of samples with residues detected =				88
DIPHENYLAMINE							
Jan–Jun	APPLES	CA, FL, MI, NY	309	108	35.0	BQL–37B	2.6M
			Total # of samples with residues detected =				108
ETHOPROP							
Jun	BANANA	NY	311	1	0.3	2B	2B
			Total # of samples with residues detected =				1
IMAZALIL							
Mar–Jun	BANANA	MI, NY	311	5	1.6	BQL–16B	96B
Feb–Jun	GRAPEFRUIT	CA, FL, MI, NY, TX	310	35	11.3	BQL–23B	.33M
Jan–Jun	ORANGES	CA, FL, MI, NY, TX, WA	311	85	27.3	BQL–10B	.87M
			Total # of samples with residues detected =				125

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
C. OTHER PESTICIDES							
MYCLOBUTANIL							
Jan–Jun	GRAPES	CA, FL, NY	297	11	3.7	23B	.39M
			Total # of samples with residues detected =				11
OMETHOATE							
Jan–Jun	APPLES	MI, NY	309	6	1.9	BQL–47B	.38M
Apr–Jun	GREEN BEANS	FL, MI, NY	238	4	1.7	33B	.49M
Jan–May	GRAPES	MI, NY	297	16	5.4	47B	.52M
Feb–Mar	LETTUCE	CA, MI	310	2	0.6	63B	88B
			Total # of samples with residues detected =				28
PARATHION							
Mar–May	APPLES	CA, NY	309	6	1.9	5B	53B
Feb	GREEN BEANS	TX	238	1	0.4	.11M	.11M
Feb–Apr	GRAPES	CA, FL, MI, NY	297	4	1.3	27B	2.7M
Mar–Jun	PEACHES	FL, NY	205	7	3.4	6B	.10M
			Total # of samples with residues detected =				18
PHORATE SULFONE							
Jun	POTATOES	NY	309	1	0.3	38B	38B
			Total # of samples with residues detected =				1

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
C. OTHER PESTICIDES							
PHOSALONE							
Mar–Apr	APPLES	FL, NY	309	2	0.6	.43M	.54M
			Total # of samples with residues detected =				2
PHOSMET							
Jan–Apr	APPLES	MI, NY	309	5	1.6	BQL–11B	.10M
Feb–Jun	PEACHES	CA, FL, MI, NY, TX	205	20	9.8	BQL–23B	.23M
			Total # of samples with residues detected =				25
PROPARGITE							
Mar	PEACHES	FL	205	2	1.0	.74M	.98M
			Total # of samples with residues detected =				2

APPENDIX 10

DISTRIBUTION OF RESIDUES DETECTED BY PESTICIDE

MONTHS	COMMODITIES	STATES WHERE SAMPLES WERE COLLECTED	SUMMARY OF RESULTS				
			NUMBER OF SAMPLES	SAMPLES WITH RESIDUES DETECTED			
				NUMBER	%	BQL &/or MIN VALUE	MAX
C. OTHER PESTICIDES							
THIABENDAZOLE*							
Jan–Jun	APPLES	FL, MI, NY, TX, WA	309	129	41.7	BQL–.11M	3.8M
Feb–Jun	BANANA	FL, MI, NY, TX, WA	311	66	21.2	BQL–26B	.56M
Jan–Jun	GRAPEFRUIT	FL, MI, NY	310	87	28.1	BQL–3B	1.6M
Jan–Jun	ORANGES	FL, MI, NY, WA	311	98	31.5	BQL–11B	1.6M
Jan–Jun	POTATOES	MI, NY	309	23	7.4	BQL–36B	1.1M
* Not analyzed by California				Total # of samples with residues detected =			403
VINCLOZOLIN							
Mar	APPLES	NY	309	1	0.3	30B	30B
Jan–May	GRAPES	CA, FL, MI, NY, TX, WA	297	132	44.4	BQL–4B	2.3M
Mar–Jun	PEACHES	FL, NY	205	4	2.0	18B	.36M
				Total # of samples with residues detected =			137
TOTAL PESTICIDES FOUND =		42					
TOTAL SAMPLES ANALYZED =		2859					

B Parts Per Billion – Units are expressed in PPB when concentrations are < 0.100 PPM.

M Parts Per Million

BQL Below Quantifiable Level

(1) Analysis was limited to apples, oranges, grapefruit, potatoes, and grapes

(2) Analysis was limited to apples, green beans, and bananas. Benomyl was non–detected for bananas.

APPENDIX 11

MULTIPLE PESTICIDE RESIDUES DETECTED

APPLES

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
8	1	0.3%	CAPTAN (1), AZINPHOS–METHYL (1), ENDOSULFANS (1)
7	1	0.3%	AZINPHOS–METHYL (1), DIPHENYLAMINE (1), THIABENDAZOLE (1)
6	1	0.3%	AZINPHOS–METHYL (1), PARATHION–METHYL (1), ENDOSULFANS (1)
5	6	1.9%	DIPHENYLAMINE (5), THIABENDAZOLE (5), AZINPHOS–METHYL (3)
4	21	6.8%	THIABENDAZOLE (18), AZINPHOS–METHYL (13), DIPHENYLAMINE (13)
3	41	13.3%	THIABENDAZOLE (27), DIPHENYLAMINE (20), AZINPHOS–METHYL (16)
2	91	29.4%	THIABENDAZOLE (56), DIPHENYLAMINE (48), AZINPHOS–METHYL (23)
1	77	24.9%	THIABENDAZOLE (20), DIPHENYLAMINE (19), AZINPHOS–METHYL (12)
0	70	22.7%	
TOTAL # OF SAMPLES:	309		
TOTAL # OF RESIDUES DETECTED:		517	

BANANAS

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
2	3	1.0%	THIABENDAZOLE (3), IMAZALIL (2), ETHOPROP (1)
1	66	21.2%	THIABENDAZOLE (63), IMAZALIL (3)
0	242	77.8%	
TOTAL # OF SAMPLES:	311		
TOTAL # OF RESIDUES DETECTED:		72	

CELERY

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
5	4	1.5%	DICLORAN (4), METHAMIDOPHOS (4), ACEPHATE (4)
4	14	5.4%	DICLORAN (12), ACEPHATE (12), CHLOROTHALONIL (10)
3	34	13.1%	PERMETHRINS (21), DICLORAN (20), ACEPHATE (20)
2	67	25.9%	CHLOROTHALONIL (39), PERMETHRINS (36), DICLORAN (19)
1	86	33.2%	DICLORAN (26), PERMETHRINS (24), CHLOROTHALONIL (22)
0	54	20.8%	
TOTAL # OF SAMPLES:	259		
TOTAL # OF RESIDUES DETECTED:		398	

APPENDIX 11

MULTIPLE PESTICIDE RESIDUES DETECTED

GREEN BEANS

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
5	4	1.7%	AZINPHOS–METHYL (4), ENDOSULFANS (4), CHLOROTHALONIL (4)
4	9	3.8%	ENDOSULFANS (9), METHAMIDOPHOS (9), ACEPHATE (9)
3	33	13.9%	METHAMIDOPHOS (28), ACEPHATE (26), ENDOSULFANS (25)
2	55	23.1%	METHAMIDOPHOS (31), ACEPHATE (27), ENDOSULFANS (20)
1	56	23.5%	ENDOSULFANS (26), DACTHAL (6), METHAMIDOPHOS (6)
0	81	34.0%	
TOTAL # OF SAMPLES:	238		
TOTAL # OF RESIDUES DETECTED:	321		

GRAPEFRUIT

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
3	2	0.6%	THIABENDAZOLE (2), IMAZALIL (2), DICOFOL (1)
2	24	7.7%	THIABENDAZOLE (23), IMAZALIL (19), ETHION (5)
1	83	26.8%	THIABENDAZOLE (62), IMAZALIL (14), ETHION (4)
0	201	64.8%	
TOTAL # OF SAMPLES:	310		
TOTAL # OF RESIDUES DETECTED:	137		

GRAPES

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
6	2	0.7%	CAPTAN (2), CHLORPYRIFOS (2), DIMETHOATE (2)
5	6	2.0%	CAPTAN (6), DIMETHOATE (6), VINCLOZOLIN (6)
4	23	7.7%	CAPTAN (18), DIMETHOATE (17), VINCLOZOLIN (17)
3	44	14.8%	CAPTAN (40), VINCLOZOLIN (38), IPRODIONE (34)
2	84	28.3%	CAPTAN (59), VINCLOZOLIN (51), IPRODIONE (43)
1	76	25.6%	IPRODIONE (22), CAPTAN (18), VINCLOZOLIN (18)
0	62	20.9%	
TOTAL # OF SAMPLES:	297		
TOTAL # OF RESIDUES DETECTED:	510		

APPENDIX 11

MULTIPLE PESTICIDE RESIDUES DETECTED

LETTUCE

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
4	3	1.0%	PERMETHRINS (3), ACEPHATE (2), DDE (2)
3	6	1.9%	ENDOSULFANS (4), DIMETHOATE (3), MEVINPHOS (2)
2	25	8.1%	PERMETHRINS (11), ACEPHATE (9), ENDOSULFANS (7)
1	71	22.9%	ENDOSULFANS (34), PERMETHRINS (14), ACEPHATE (9)
0	205	66.1%	
TOTAL # OF SAMPLES:	310		
TOTAL # OF RESIDUES DETECTED:		151	

ORANGES

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
3	5	1.6%	THIABENDAZOLE (5), IMAZALIL (5), CHLORPYRIFOS (3)
2	60	19.3%	THIABENDAZOLE (55), IMAZALIL (46), ETHION (6)
1	80	25.7%	THIABENDAZOLE (38), IMAZALIL (34), ETHION (2)
0	166	53.4%	
TOTAL # OF SAMPLES:	311		
TOTAL # OF RESIDUES DETECTED:		215	

PEACHES

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
5	3	1.5%	DICLORAN (3), IPRODIONE (3), CAPTAN (2)
4	14	6.8%	IPRODIONE (12), CAPTAN (10), DICLORAN (10)
3	31	15.1%	IPRODIONE (19), DICLORAN (16), PHOSMET (11)
2	59	28.8%	IPRODIONE (36), DICLORAN (31), CHLORPYRIFOS (13)
1	62	30.2%	DICLORAN (26), IPRODIONE (22), AZINPHOS–METHYL (6)
0	36	17.6%	
TOTAL # OF SAMPLES:	205		
TOTAL # OF RESIDUES DETECTED:		344	

APPENDIX 11

MULTIPLE PESTICIDE RESIDUES DETECTED

POTATOES

A	B	C	D
# OF RESIDUES DETECTED/SAMPLE	SAMPLES #	%	3 MOST FREQUENTLY DETECTED PESTICIDES (*)
4	1	0.3%	DDT (1), CHLORPROPHAM (1), ENDOSULFANS (1)
3	13	4.2%	CHLORPROPHAM (13), ENDOSULFANS (10), DDE (7)
2	44	14.2%	CHLORPROPHAM (39), DDE (18), THIABENDAZOLE (16)
1	173	56.0%	CHLORPROPHAM (157), DDE (10), ENDOSULFANS (3)
0	78	25.2%	
TOTAL # OF SAMPLES:	309		
TOTAL # OF RESIDUES DETECTED:		304	

* Number of samples with positive findings

APPENDIX 12. TOLERANCE VIOLATIONS REPORTED TO FDA

ITEM NO.	DATE OF COLLECTION	STATE	PESTICIDE	COMMODITY	TOLERANCE	CONCENTRATION DETECTED
1	92-01-15	Florida	Chlorothalonil	Lettuce	No Tolerance	0.23 ppm
2	92-02-10	New York	Thiabendazole	Bananas*	0.4 ppm	0.56 ppm
3	92-02-11	Florida	Acephate Methamidophos	Green Beans	3 ppm Combined Tolerance	3.8 ppm
4	92-02-11	Florida	Methamidophos	Green Beans	No Tolerance	0.46 ppm
5	92-03-02	New York	Vinclozolin	Apples	No Tolerance	30 ppb
6	92-03-02	New York	Chlorpropham	Apples	No Tolerance	28 ppb
7	92-03-03	Texas	Dacthal (DCPA)	Celery	No Tolerance	41 ppb
8	92-03-03	Texas	Dacthal (DCPA)	Celery	No Tolerance	15 ppb
9	92-03-04	California	Permethrins	Green Beans*	No Tolerance	0.85 ppm
10	92-03-04	California	Methamidophos	Green Beans*	No Tolerance	0.11 ppm
11	92-03-05	New York	Parathion	Grapes*	1 ppm	2.7 ppm
12	92-04-09	Michigan	Chlorpyrifos	Grapes*	0.5 ppm	0.77 ppm
13	92-04-27	New York	Chlorpyrifos	Lettuce	No Tolerance	10 ppb
14	92-04-27	Washington	Dimethoate	Grapes*	1 ppm	1.5 ppm
15@	92-05-04	Texas	Iprodione	Celery	No Tolerance	49 ppb
16	92-05-12	Florida	Chlorothalonil	Apples	No Tolerance	Unable to quantitate, but Chlorothalonil is present
17@	92-05-12	New York	Iprodione	Celery	No Tolerance	0.29 ppm
18	92-05-13	Michigan	Dimethoate	Peaches	No Tolerance	BQL (< 19 ppb)
19	92-06-03	Texas	Dacthal (DCPA)	Celery	No Tolerance	6 ppb

* Imported commodity

@ There is a Section 18 Emergency Exemption for celery grown in California dated July 21, 1992. This sample does not fall under the exemption and was not grown in California.

APPENDIX 13. CHEMICAL ACTION OF PESTICIDES DETECTED BY PDP

PESTICIDE	CHEMICAL ACTION
2,4-D	Pre- and Post-Harvest Herbicide
ACEPHATE	Insecticide, weak Cholinesterase Inhibitor (the metabolite is Methamidophos)
ANILAZINE	Fungicide, leaf action
AZINPHOS-METHYL	Insecticide, Cholinesterase Inhibitor
BENOMYL	Pre- and Post-Harvest Fungicide (analyzed as Carbendazim)
CAPTAN	Protectant, Pre- and Post-Harvest Fungicide
CARBARYL	Insecticide, weak Cholinesterase Inhibitor
CHLOROTHALONIL	Fungicide, leaf action
CHLOROPROPHAM	Herbicide/Growth Regulator Pre- and Post-Emergence
CHLORPYRIFOS	Insecticide, Cholinesterase Inhibitor
CYPERMETHRIN	Insecticide
DDE	Degradation Product of DDT
DDT	Insecticide (All uses canceled, degrades to DDE and DDD)
DACTHAL (DCPA)	Herbicide
DIAZINON	Insecticide, Cholinesterase Inhibitor
DICHLORVOS '(DDVP)	Insecticide/Acaricide post-harvest fumigant and penetrant action
DICLORAN	Pre- and Post-Harvest Fungicide
DICOFOL	Acaricide (the metabolite is dichlorobenzophenone)
DIMETHOATE	Insecticide/Acaricide Cholinesterase Inhibitor
DIPHENYLAMINE	Pre- and Post-Harvest Fungicide
DISULFOTON SULFONE	Insecticide/Acaricide Cholinesterase Inhibitor (Oxidized to Sulfone in plants)
ENDOSULFANS	Insecticide/Acaricide, contact action
ETHION	Insecticide/Acaricide, contact action Cholinesterase Inhibitor

APPENDIX 13. CHEMICAL ACTION OF PESTICIDES DETECTED BY PDP

PESTICIDE	CHEMICAL ACTION
ETHOPROP	Nematocide/Insecticide (soil insecticide)
IMAZALIL	Post-Harvest Fungicide
IPRODIONE	Fungicide
METHAMIDOPHOS	Insecticide/Acaricide Cholinesterase Inhibitor
METHIDATHION	Fungicide, contact action
METHOXYCHLOR	Insecticide/Acaricide food storage control spray
MEVINPHOS	Insecticide/Acaricide Cholinesterase Inhibitor
MYCLOBUTANIL	Fungicide
OMETHOATE	Insecticide/Acaricide - Cholinesterase Inhibitor (Dimethoate Metabolite)
PARATHION	Insecticide/Acaricide Cholinesterase Inhibitor
PARATHION-METHYL	Insecticide/Acaricide Cholinesterase Inhibitor
PERMETHRINS	Insecticide, repellent
PHORATE SULFONE	Insecticide/Acaricide Cholinesterase Inhibitor
PHOSALONE	Insecticide/Acaricide Cholinesterase Inhibitor
PHOSMET	Insecticide/Acaricide Cholinesterase Inhibitor
PROPARGITE	Acaricide, residual killing action
QUINTOZENE (PCNB)	Soil Fungicide, seed dressing agent
THIABENDAZOLE	Pre- and Post-Harvest Fungicide
VINCLOZOLIN	Fungicide, contact action